

EPA-R5-2013-003300-1

**Charles Norris**  
<[cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)>  
10/25/2005 07:03 PM

To Timothy Drexler  
cc  
bcc

Subject Follow-up to meeting question

Tim,

Sorry about the delay getting back to you. I had a rush of alligators snapping at me. With them under control, I can get back to draining the swamp. (I know that's not politically or environmentally correct in today's world, but it's an old family allegory!)

My question for Ed Karecki has to do with a phrase that is repeatedly used in the FSP. The phrase talks about where there is "overlap" between areas of placement of CCBs and a "significant ecological habitat".

I'd like a read on USEPA's understanding with respect to both "overlap" and "significant ecological habitat".

Thanks in advance.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-2

**EDWARD  
KARECKI/R5/USEPA/US**  
10/28/2005 03:35 PM

To cnorris  
cc Timothy Drexler  
bcc

Subject Re: Fw: Follow-up to meeting question

Chuck,

Significant ecological habitat and overlap with CCBs are described in the Pines RI /FS Workplan, Vol. 6, Section 1.2.2. Please let me know if you need a copy of this section or call me if you have any further questions or wish to discuss this issue.

Edward Karecki  
312-353-3202

EPA-R5-2013-003300-3

**Charles Norris**  
<cnorris@geo-hydro.com>

11/03/2005 12:52 PM

To Timothy Drexler

cc

bcc

Subject RI/FS SMS non-text items

Tim,

Yes, I do need the SMS Figures, Photographs, Tables and Appendices. If you could have someone put them on a CD for me, it would be very much appreciated.

I downloaded the Tables of data related to the boron isotope and tritium study that was the subject of the April 05 meeting. Is there a text somewhere, other than the transcript, that goes with the tables?

Thanks

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-4

**EDWARD  
KARECKI/R5/USEPA/US**

11/09/2005 04:05 PM

To Charles Norris

cc Timothy Drexler

bcc

Subject Re: Fw: Follow-up to meeting question

Chuck,

The best description of habitat evaluation is in Sections 3.3.3 of the RI/FS Workplan, Volume 2, Field Sampling Plan. Section 3.3.2 describes the visual inspection for CCBs. The eco risk assessment will primarily evaluate those areas where wildlife habitats and CCBs occur in the same location. The methods described in "A Techniques Manual for Measurement of Wildlife Habitat Parameters Used in the US Fish and Wildlife Service's Terrestrial Habitat Criteria Handbooks" will be used, as qualified in Section 3.3.3. To some extent the criteria described in section 3.3.2 and 3.3.3 are subject to professional judgement. EPA will review the wildlife habitat maps to ensure that appropriate areas are included in the eco risk assessment.

I hope that this provides some clarification. Please let me know if you have any additional questions or wish to discuss further.

Edward Karecki  
312-353-3202

Charles Norris <cnorris@geo-hydro.com>

**Charles Norris  
<cnorris@geo-hydro.com>**

10/30/2005 01:58 PM

To EDWARD KARECKI/R5/USEPA/US@EPA

cc Timothy Drexler/R5/USEPA/US@EPA

Subject Re: Fw: Follow-up to meeting question

> Significant ecological habitat and overlap with CCBs are described in  
> the Pines RI/FS Workplan, Vol. 6, Section 1.2.2. Please let me know if  
> you need a copy of this section or call me if you have any further  
> questions or wish to discuss this issue.

Ed (or do you prefer Edward?),  
I have a copy of the RI/FS work plan, but thank you for asking. My original query is because the discussions in Vol. 6, Section 1.2.2, as well as the discussions in other sections of Volume 6, did not leave me with a clear understanding of either "overlap" or "significant ecological habitat". Rereading it hasn't really helped.

The work plan activities that are described toward developing a site ecological risk assessment are heavily controlled by the understanding (definition, meaning) of those terms. USEPA has signed off on the proposed activities, so I'm sure those terms carry fairly precise meanings for you. It would greatly help me interpret the work plan for the citizens if you could flesh out some what USEPA's understanding of those terms.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-5

**Charles Norris**  
<[cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)>

04/17/2006 11:30 AM

To Timothy Drexler

cc

bcc

Subject PINES meeting

Tim,

Cathi tells me there is an effort underway to set up a public meeting at Town of Pines to go over sampling(?) data results. She thinks it would be a good idea if I had the opportunity to review the data, collection program, methodologies and conclusions, if any, prior to the meeting. I think she has a good idea.

What is the best way for me to access the information, and background to it?

There is a related, underlying question, as well. Both the SMS and the FSP make it clear that, at the time each was written, the PRP consultant team did not have a method to identify the CCPs. This obviously created an impediment to implementing the multitude of sampling programs (in-landfill, ecological, road side, etc.) called for in the FSP. Presumably, if at least some of the sampling programs have been implemented and results are going to be discussed, a defensible protocol/method for identifying CCPs was developed and has been blessed by USEPA. I have received nothing that describes the protocol/method that has been developed, and apparently used, and would be very interested in reviewing it.

Could you send me the details of the method(s) that have been developed to allow reliable identification of the CCPs, or direct me to where I might get it?

--

Chuck

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Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-6

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
10/10/2006 09:35 AM

To Timothy Drexler

cc

bcc

Subject Re: Fw: Pines AOC II - RI Locations

Tim,

Any chance the location data is available, or can be made available, in a spreadsheet or database?

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-7

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
11/28/2006 05:24 PM

To Timothy Drexler, Mark Hutson  
cc  
bcc  
Subject PINES data and documents

Tim,

I hope you had a good Thanksgiving. Too small a turkey here, so not enough leftovers. We're sending some snow and cold your direction, by the way.

I'd like to (electronically) introduce you to Mark Hutson, a new principal scientist at Geo-Hydro. Now that we are cleared to devote significant effort for PINES, Mark is coming up to speed on the existing documents. Apparently we have only Volume 1 of the SMS, and Volume II has the appendices. Can you email us (either one) Volume II if you have it or offer a suggestion as how to get it?

On the premise that this problem may recur, does the EPA or the contractor maintain a web or ftp site from which one can download project documents without pestering people? If so, the location and access details would be very helpful.

Thanks in advance.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-8

**Mark Hutson**  
**<mhutson@geo-hydro.com>**  
11/29/2006 10:25 AM

To Charles Norris  
cc Timothy Drexler  
bcc

Subject Re: PINES data and documents

Tim / Chuck

I found an address to the Pines web site on the Region 5 server and located the Appendices that I was looking for.

Tim, I look forward to meeting you at some point down the road.

Thanks,

Mark Hutson  
Geo-Hydro, Inc  
303-948-1417

Charles Norris wrote:

> Tim,  
>  
> I hope you had a good Thanksgiving. Too small a turkey here, so not  
> enough leftovers. We're sending some snow and cold your direction, by  
> the way.  
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> access details would be very helpful.  
>  
> Thanks in advance.

EPA-R5-2013-003300-9

**Timothy  
Drexler/R5/USEPA/US**  
11/30/2006 09:34 AM

To Mark Hutson  
cc Charles Norris  
bcc  
Subject Re: PINES data and documents

Hi Mark:

Glad you found what you needed. I will be periodically adding information to that Site. In the mean time, let me know if you have any questions.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

Mark Hutson <mhutson@geo-hydro.com>

**Mark Hutson**  
**<mhutson@geo-hydro.com>**

11/29/2006 10:25 AM

To Charles Norris <cnorris@geo-hydro.com>  
cc Timothy Drexler/R5/USEPA/US@EPA

Subject Re: PINES data and documents

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> access details would be very helpful.  
>  
> Thanks in advance.

EPA-R5-2013-003300-10

**Mark Hutson**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

01/16/2007 05:30 PM

To Timothy Drexler

cc cnorris

bcc

Subject Pines Data Availability

Hi Tim

I have pretty much finished my review of the planning documents on the Pines site and have been looking into some of the references. I noted that both the Site Management Strategy and Field Sampling Plan refer to analytical data that has been collected at Yard 520 since the early 1980's and that some of the data was available upon request. I was wondering if EPA had obtained any of this data, and if so, if I could get my hands on it. I'd like to go all the way back if possible. Given all the discussion in the documents about background concentrations and other potential sources, I think it might be instructive to look at groundwater quality over the longer time-frame to see what has changed.

Also, have the results from any of the RI/FS sampling come in yet? I'd like to take a look at that too when it is available.

Thanks for your help.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-11

**Timothy  
Drexler/R5/USEPA/US**  
01/17/2007 08:27 AM

To Mark Hutson  
cc cnorris  
bcc  
Subject Re: Pines Data Availability

Hi Mark:

I'm not sure if your FSP reference is referring to soil sampling or groundwater sampling data in Yard 520. There is little, if any, old soil data. There is, however, a lot of older groundwater data (before US EPA became involved in 2001) that is part of the ongoing IDEM solid waste program monitoring well network of the Yard 520 landfill. There is also similar data from the other nearby landfills. This data can be obtained from IDEM. The person that I received the information from was Tom Brown. His email address is [tbrown@dem.state.in.us](mailto:tbrown@dem.state.in.us). I believe his phone number is 317-233-6540.

As far as new information goes, we received the August sampling in mid-December. I sent that to Chuck in both pdf and Excel formats.

Let me know if you have any other questions.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367

fax: 312.886.4071

Mark Hutson <[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

**Mark Hutson**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

01/16/2007 05:30 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc [cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)

Subject Pines Data Availability

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Thanks for your help.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-12

Mark Hutson  
<mhutson@geo-hydro.com>  
01/17/2007 08:43 AM

To Timothy Drexler  
cc  
bcc  
Subject RE: Pines Data Availability

Thanks Tim

I was thinking about groundwater samples. I'll contact IDEM to get the files.

Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Wednesday, January 17, 2007 7:28 AM  
To: Mark Hutson  
Cc: cnorris@geo-hydro.com  
Subject: Re: Pines Data Availability

Hi Mark:

I'm not sure if your FSP reference is referring to soil sampling or groundwater sampling data in Yard 520. There is little, if any, old soil data. There is, however, a lot of older groundwater data (before US EPA became involved in 2001) that is part of the ongoing IDEM solid waste program monitoring well network of the Yard 520 landfill. There is also similar data from the other nearby landfills. This data can be obtained from IDEM. The person that I received the information from was Tom Brown. His email address is tbrown@dem.state.in.us. I believe his phone number is 317-233-6540.

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Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

Mark Hutson  
<mhutson@geo-hydro.com>

01/16/2007 05:30 PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc

cnorris@geo-hydro.com

Subject  
Pines Data Availability

Hi Tim

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Also, have the results from any of the RI/FS sampling come in yet? I'd like to take a look at that too when it is available.

Thanks for your help.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
mhutson@geo-hydro.com

EPA-R5-2013-003300-13

**Timothy  
Drexler/R5/USEPA/US**  
01/17/2007 08:49 AM

To Mark Hutson  
cc  
bcc  
Subject RE: Pines Data Availability

You're welcome, Mark. Good luck. Also, I checked my previous message to you and saw that I fat-fingered the email address. Its not ".lus" at the end, just ".us".

-Tim

Mark Hutson <mhutson@geo-hydro.com>

**Mark Hutson**  
**<mhutson@geo-hydro.com>**  
01/17/2007 08:43 AM

To Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject RE: Pines Data Availability

Thanks Tim

I was thinking about groundwater samples. I'll contact IDEM to get the files.

Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Wednesday, January 17, 2007 7:28 AM  
To: Mark Hutson  
Cc: cnorris@geo-hydro.com  
Subject: Re: Pines Data Availability

Hi Mark:

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Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

Mark Hutson  
<mhutson@geo-hydro.com>

01/16/2007 05:30  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc  
cnorris@geo-hydro.com

Subject  
Pines Data Availability

Hi Tim

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Thanks for your help.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
mhutson@geo-hydro.com



EPA-R5-2013-003300-14

**Mark Hutson**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

02/20/2007 01:05 PM

To Timothy Drexler

cc cnorris

bcc

Subject Pines As Bioavailability Question

Hi Tim

I have a quick question on the Arsenic Bioavailability study that came out along with the latest Progress Report on the Pines site. Do you know where the two CCB samples came from? From the report I can't tell if they were collected from Pines or if they came from somewhere else.

Thanks,  
Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-15

**Mark Hutson**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>  
03/05/2007 10:54 AM

To: Timothy Drexler  
cc  
bcc  
Subject: FW: Pines As Bioavailability Question

Hi Tim

Are you around? I didn't hear back from you about the question below.  
Did you have any information on where the AS bioavailability samples came from?

Thanks  
Mark Hutson

-----Original Message-----

**From:** Mark Hutson [<mailto:mhutson@geo-hydro.com>]  
**Sent:** Tuesday, February 20, 2007 12:06 PM  
**To:** Tim Drexler ([Drexler.Timothy@epamail.epa.gov](mailto:Drexler.Timothy@epamail.epa.gov))  
**Cc:** [cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)  
**Subject:** Pines As Bioavailability Question

Hi Tim

I have a quick question on the Arsenic Bioavailability study that came out along with the latest Progress Report on the Pines site. Do you know where the two CCB samples came from? From the report I can't tell if they were collected from Pines or if they came from somewhere else.

Thanks,  
Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-16

**Mark Hutson**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>  
03/23/2007 03:01 PM

To Timothy Drexler  
cc  
bcc  
Subject Pines drilling and analytical data

Tim

I'm following up on the message that I left for you this morning.

In going over the first couple of rounds of analytical data from the Pines site we noticed that the Yard 520 wells located immediately north of the site (TW-15D, TW-15S, TW-16D, TW-16S, TW-18D and TW-18S) have consistently shown significantly higher concentrations of Boron from the deep screens than from the shallow screens. This is not unexpected considering the amount of precipitation that the area receives and the associated dilution of the top of the aquifer.

However, we also notice that there do not seem to be any nested well pairs among the RI wells installed as part of the investigation. The work plan indicated that the plan was to do some vertical profiling using hydro-punch samples to check for vertical variation and that well pairs would be considered if vertical variation was found. We'd like to take a look at the hydro-punch logs and analytical data as well as the boring logs and well construction details from the monitoring wells to see what was found. Is there an FTP site or web page set-up that we could get into to download those pieces of information? If not, what's the next best way to get hold of them?

Thanks for your help.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-17

**DSullivan@NiSource.com**

04/13/2007 10:37 AM

To Timothy Drexler

cc kherron

bcc

Subject TAP Progress Report - Pines

Tim/Kevin - Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap107.pdf)

Dan Sullivan

NiSource Environmental Health & Safety

(219) 647-5248

---

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 tap107.pdf

EPA-R5-2013-003300-18

"Mark Hutson "  
<mhutson@geo-hydro.com>

06/29/2007 03:16 PM

To Timothy Drexler

cc

bcc

Subject RE: Last Weeks Meeting

Tim

The way I'm thinking about the potential issue of build-up of contaminants in the soil is that we need to look at the soils in places where groundwater makes a rapid change from high to lower concentration over a relatively short distance. It could be associated with the main landfill or the roadway fills.

In addition to the old glass factory, I would suggest that you might want to take a look at the west side of the landfill where leachate is exiting the side of the fill. At least when I was there a couple of weeks ago leachate was discharging from the side of the landfill and running down the ditch on the east side of the road. It is also underflowing the road and discharging into the ditch on the west side of the road. Chuck said the same discharges were occurring the last time he was out there.

I was hoping the review of pictures and or sediment descriptions from the water line work might have identified suspect areas. On the other hand, if the water lines are above the water table you wouldn't expect to see anything. I think I might do some geoprobng in suspect areas to see if you can identify areas of visually stained soil below the water table before taking samples for analysis.

Hope that helps.

Take care,  
Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Thursday, June 21, 2007 10:28 AM  
To: Mark Hutson  
Subject: Re: Last Weeks Meeting

Thanks, Mark. I really appreciate the note. I'm glad that you and Chuck could make the meeting.

I know that not everyone will like what I have to say, or like the process. But, I want to try to get them to understand where things come from and have some idea of where things are going with the potential hitches in the road, so that I can minimize misunderstandings early.

I looked at the tan sample of CCB when I returned to the office and noticed that, just as Chuck said, it is peppered with the black CCB granules. In the jar, the fine tan powder coats those grains, but in soil with precipitation events, the peppered texture would be much more pronounced. I've discussed the limitations of relying solely on visual identification with ENSR. I told them that I would prefer an identification method that includes a percentage of samples that undergo further analysis in a lab to confirm the visual

identification. We'll see what they come up with.

Additionally, after Chuck's elaboration on the arsenic tie-in to the potential sub-CCB soil contamination, ENSR is looking closely at the area near the old glass factory area on Hwy 20 north of Yard 520. That was the area with the highest arsenic hits. They told me they still don't have a working plan on how to sample, though. Let me know if you have suggestions.

Talk to you soon.

-Tim

"Mark Hutson"  
<mhutson@geo-hydro.com>

06/21/2007 10:09  
AM

To  
Timothy Drexler/R5/USEPA/US@EPA  
CC

Subject

Last Weeks Meeting

Tim

I just wanted to drop you a note and tell you that I thought you did a very nice job at the public meeting in Pines last week. You handled questions well and your willingness to sit outside and talk through things after the library closed was the best thing you could have done. Chuck and I went out for a drink with several of the citizens afterward and it seemed that like everyone was happy with the meeting and your public demeanor.

I'm sure you don't get positive feedback very often so I thought I'd let you know how well you were received by the citizens that I talked to.

Take care,

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
mhutson@geo-hydro.com

EPA-R5-2013-003300-19

**Timothy  
Drexler/R5/USEPA/US**  
09/07/2007 11:47 AM

To "Mark Hutson"  
cc  
bcc  
Subject Re: Draft EPA CCW Risk Assessment

No, I hadn't seen this. Thanks, Mark. I appreciate it.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

"Mark Hutson" <mhutson@geo-hydro.com>

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
09/04/2007 05:23 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject Draft EPA CCW Risk Assessment

Tim

You may have already seen this but I thought that I'd send it to you anyway, just in case.

Have a good one,  
Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

[attachment "EPA-HQ-RCRA-2006-0796-0009.pdf" deleted by Timothy  
Drexler/R5/USEPA/US]

EPA-R5-2013-003300-20

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

09/25/2007 10:17 AM

To Timothy Drexler

cc

bcc

Subject PINES residence addresses

Tim

Do you have the addresses of the residences that are being taken off of the supplied water list?

Thanks

Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-21

**Timothy  
Drexler/R5/USEPA/US**  
09/26/2007 09:17 AM

To lbradley  
cc eperry  
bcc  
Subject Rad Questions at PINES

Hi Lisa:

Attached are a few questions that were posed to us from P.I.N.E.S. regarding the rad work at the Pines Site. I need a little assistance with some of them. Could you please send me information regarding the items marked "analytical methodology" and "data quality judgments"? I need any appropriate lab data sheets for support. Call me if we need to discuss.

Thanks, Lisa.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071



Rad Questions for EPA.pdf

EPA-R5-2013-003300-22

**"Bradley, Lisa"**  
**<lbradley@ensr.aecom.com>**  
09/26/2007 04:24 PM

To Timothy Drexler  
cc  
bcc

Subject RE: Rad Questions at PINES

Thanks Tim - I'll get back to you! :) LIAS

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Wednesday, September 26, 2007 10:17 AM  
To: Bradley, Lisa  
Cc: Perry, Elizabeth  
Subject: Rad Questions at PINES

Hi Lisa:

Attached are a few questions that were posed to us from P.I.N.E.S. regarding the rad work at the Pines Site. I need a little assistance with some of them. Could you please send me information regarding the items marked "analytical methodology" and "data quality judgments"? I need any appropriate lab data sheets for support. Call me if we need to discuss.

Thanks, Lisa.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

(See attached file: Rad Questions for EPA.pdf)

EPA-R5-2013-003300-23

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
10/02/2007 12:05 PM

To Timothy Drexler  
cc  
bcc  
Subject Results from January Sampling event

Tim

As unlikely and unheard of as it is, I don't seem to be able to find the results of the from the January sampling event at Pines.

I'm betting that Chuck got the results attached to a progress report that he failed to forward to me before I got on the distribution list. He's in Springfield at a meeting with the Illinois EPA today and I won't be able to get them from him until he gets back.

Is there any chance that you would have those results readily available and could send them to me?

Thanks, I appreciate it.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-24

**Timothy  
Drexler/R5/USEPA/US**  
10/02/2007 03:17 PM

To "Mark Hutson"  
cc  
bcc  
Subject Re: Results from January Sampling event

Hi Mark:

Attached are the January results. Call me if you have any questions.

-Tim



ProgressReportTable\_RIQ3\_WG\_WP\_WS\_0607.xls

"Mark Hutson" <mhutson@geo-hydro.com>

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
10/02/2007 12:05 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject Results from January Sampling event

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Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



EPA-R5-2013-003300-25

**Timothy  
Drexler/R5/USEPA/US**  
11/07/2007 11:01 AM

To eperry  
cc lbradley, mhutson, cnorris  
bcc  
Subject Arsenic soil sampling: Pines Site

Hi Elizabeth:

After confering with a few folks, we'd like to see the following. Collect both soil and filtered ground water samples. We wil use the ground water sample results to subtract against the soil results to give an estimate of the soil fraction. Let me know if you'd like to discuss this approach.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

EPA-R5-2013-003300-26

**"Bradley, Lisa"**  
**<lbradley@ensr.aecom.com>**  
11/19/2007 05:04 PM

To Timothy Drexler  
cc  
bcc

Subject Pines - Response to GeoHydro Comments

Tim –

Attached please find two memos. One provides responses to the GeoHydro comments dated 9-21-07 that you requested ENSR address (“Analytical Methodology” and “Data Quality Judgments”). The second provides responses to the remaining comments. Please let me know if you have any questions!

:) LASI

<<Resp-GeoHydro-Analytical-DataQual-final-11-19-07.pdf>>  
<<Resp-GeoHydro-RemainingComments-Final-11-19-07.pdf>>

---

Lisa JN Bradley, Ph.D., DABT

Senior Toxicologist

ENSR

2 Technology Park Drive

Westford, MA 01886

978-589-3059 (direct)

978-846-3463 (cell)

866-758-4856 (fax)

lbradley@ensr.aecom.com

www.ensr.aecom.com

978-589-3000  Resp-GeoHydro-Analytical-DataQual-final-11-19-07.pdf

 Resp-GeoHydro-RemainingComments-Final-11-19-07.pdf

EPA-R5-2013-003300-27

"HERRON, KEVIN"  
<KHERRON@idem.IN.gov>  
11/20/2007 04:35 PM

To Timothy Drexler  
cc "HERRON, KEVIN"  
bcc  
Subject RE: work plan for additional soil sampling at Pines

Hello Tim:

It seems to be acceptable to me as well. It may be difficult to obtain a sample from beneath suspected CCBs (underlying native soils) without getting some kind of cross contamination though. This work activity might be something that we should observe and document how it is being performed, especially with the potential for cross contamination of CCBs in the overlying material.

Kevin

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Tuesday, November 20, 2007 3:26 PM  
To: HERRON, KEVIN  
Subject: Fw: work plan for additional soil sampling at Pines

Hi Kevin:

This looks OK to me to answer the questions raised by GeoHydro. What do you think?

-Tim

----- Forwarded by Timothy Drexler/R5/USEPA/US on 11/20/2007 02:25 PM  
-----

"Perry,  
Elizabeth"  
<EPerry@ensr.aecom.com>

11/20/2007 02:05  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA,  
"KEVIN HERRON"  
<KHERRON@idem.in.gov>  
cc  
"Bradley, Lisa"  
<lbradley@ensr.aecom.com>

Subject  
work plan for additional soil  
sampling at Pines

Tim and Kevin - Attached is a memorandum discussing the plan for additional soil sampling at the Pines Area of Investigation as requested by USEPA. Please feel free to call with any questions or comments.

Elizabeth

<<Pines\_AddlSoilSampling.pdf>>

A. Elizabeth Perry, P.G.

Senior Hydrogeologist

ENSR

Westford, MA, USA

tel: 978-589-3167

fax: 978-589-3100 [attachment "Pines\_AddlSoilSampling.pdf" deleted by Timothy Drexler/R5/USEPA/US]

EPA-R5-2013-003300-28

**Charles Norris**  
<cnorris@geo-hydro.com>

01/04/2008 09:00 AM

To Timothy Drexler

cc

bcc

Subject Re: Pines AOC II Progress Report 12-17-07

Tim,  
Happy New Year!

I just read your email to Larry Silvestri and have a question. There is a reference in it to observations from cores taken in the north cells at Yard 520. I've seen that reference before, I have been unable to track down in the RI or background data when/where that coring program fits or was done. I'm aware of some "push" coring performed a year or two around the perimeter of the north unit to establish the extent of disposal outside the unit boundaries, but was there any coring program done within the north unit, analogous to that for the south unit, as part of the RI? If so, could you direct me to it? Thanks.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-29

**Timothy  
Drexler/R5/USEPA/US**  
01/04/2008 09:33 AM

To Charles Norris  
cc  
bcc

Subject Re: Pines AOC II Progress Report 12-17-07

Happy New Year back, Chuck. Hope you had a great holiday.

The coring information from the north cells has not been part of any deliverable document yet from ENSR, so you would not have it. I'll gather that information and get it to you as soon as I can. Hopefully today.

-Tim

Charles Norris <cnorris@geo-hydro.com>

**Charles Norris  
<cnorris@geo-hydro.com>**  
01/04/2008 09:00 AM

To Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject Re: Pines AOC II Progress Report 12-17-07

Tim,  
Happy New Year!

I just read your email to Larry Silvestri and have a question. There is a reference in it to observations from cores taken in the north cells at Yard 520. I've seen that reference before, I have been unable to track down in the RI or background data when/where that coring program fits or was done. I'm aware of some "push" coring performed a year or two around the perimeter of the north unit to establish the extent of disposal outside the unit boundaries, but was there any coring program done within the north unit, analogous to that for the south unit, as part of the RI? If so, could you direct me to it? Thanks.

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Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-30

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

01/18/2008 12:28 PM

To Timothy Drexler

cc

bcc

Subject Pines Radionuclide Data

Tim

Did you ever get anything from your person who was looking at Larry Jensen's comments on the radionuclide data?

We got an e-mail from Larry Sylvestri yesterday expressing his concern about the residential soil sampling. I've suggested that we set-up a conference call and talk through the concerns rather than relying on a string of e-mails. Would you be willing to participate? If so, how's your schedule look next week?

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-31

**Timothy  
Drexler/R5/USEPA/US**  
01/21/2008 10:19 PM

To "Mark Hutson"  
cc  
bcc  
Subject Re: Pines Radionuclide Data

Hi Mark:

I've had a tremendous amount of trouble getting time with our rad person. Since Larry left, Gene Jablinowski is the only one we have in the Region. He is unfortunately working on a number of high-level projects. Last week I was finally able to schedule time with Gene this Thursday to talk to him about Larry's rad issues at Pines. I will unfortunately be in Minnesota at another Site all of this week, so I'll be calling him from the field. So, this week I would not be prepared to discuss the issue. I should be available most of next week, though. Give me a couple of dates and times that work for everyone that is interested in participating, and I'll try to get Gene to join me on a call. If I am successful in getting Gene, I can also arrange a call-in phone line.

Let me know. Talk to you soon.

-Tim

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

-----"Mark Hutson" <mhutson@geo-hydro.com> wrote: -----

To: Timothy Drexler/R5/USEPA/US@EPA  
From: "Mark Hutson" <mhutson@geo-hydro.com>  
Date: 01/18/2008 12:28PM  
Subject: Pines Radionuclide Data

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Did you ever get anything from your person who was looking at Larry Jensen's comments on the radionuclide data?

We got an e-mail from Larry Sylvestri yesterday expressing his concern about the residential soil sampling. I've suggested that we set-up a conference call and talk through the concerns rather than relying on a string of e-mails. Would you be willing to participate? If so, how's your schedule look next week?

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



EPA-R5-2013-003300-32

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
01/22/2008 11:43 AM

To Timothy Drexler  
cc  
bcc  
Subject RE: Pines Radionuclide Data

Tim

I'm trying to find out when next week works for the most folks. It's looking like sometime Thursday or on Friday morning. I'll have to get back to you with more specific options later. I think they are trying to get it arranged so Larry can be on the phone to hear directly what Gene has to say. That would save a lot of potential e-mails.

I'll get back with you when I know more. Thanks

Mark

-----Original Message-----

**From:** Drexler.Timothy@epamail.epa.gov [mailto:Drexler.Timothy@epamail.epa.gov]  
**Sent:** Monday, January 21, 2008 9:19 PM  
**To:** Mark Hutson  
**Subject:** Re: Pines Radionuclide Data

Hi Mark:

I've had a tremendous amount of trouble getting time with our rad person. Since Larry left, Gene Jablinowski is the only one we have in the Region. He is unfortunately working on a number of high-level projects. Last week I was finally able to schedule time with Gene this Thursday to talk to him about Larry's rad issues at Pines. I will unfortunately be in Minnesota at another Site all of this week, so I'll be calling him from the field. So, this week I would not be prepared to discuss the issue. I should be available most of next week, though. Give me a couple of dates and times that work for everyone that is interested in participating, and I'll try to get Gene to join me on a call. If I am successful in getting Gene, I can also arrange a call-in phone line.

Let me know. Talk to you soon.

-Tim

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

-----"Mark Hutson" <mhutson@geo-hydro.com> wrote: -----

To: Timothy Drexler/R5/USEPA/US@EPA  
From: "Mark Hutson" <mhutson@geo-hydro.com>  
Date: 01/18/2008 12:28PM  
Subject: Pines Radionuclide Data

Tim

Did you ever get anything from your person who was looking at Larry Jensen's comments on the radionuclide data?

We got an e-mail from Larry Sylvestri yesterday expressing his concern about the residential soil sampling. I've suggested that we set-up a conference call and talk through the concerns rather than relying on a string of e-mails. Would you be willing to participate? If so, how's your schedule look next week?

Mark Hutson

Geo-Hydro, Inc.

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

=

EPA-R5-2013-003300-33

**Timothy**  
**Drexler/R5/USEPA/US**  
01/24/2008 07:14 AM

To "Mark Hutson"  
cc  
bcc  
Subject RE: Pines Radionuclide Data

Thanks Mark. I will be talking to Gene today. I will find out his availability for next Thurs and Fri .  
Tim

EPA-R5-2013-003300-34

"Mark Hutson "  
<mhutson@geo-hydro.com>

01/24/2008 05:18 PM

To Timothy Drexler

cc

bcc

Subject RE: Pines Radionuclide Data

Tim

Thanks for this. The group confirmed that anytime next Thursday or Friday will work. Just let us know when.

I hear it's cold back there. Bad time to be traveling to Minnesota!  
Take care.

Mark

-----Original Message-----

**From:** Drexler.Timothy@epamail.epa.gov [mailto:Drexler.Timothy@epamail.epa.gov]

**Sent:** Thursday, January 24, 2008 6:15 AM

**To:** Mark Hutson

**Subject:** RE: Pines Radionuclide Data

Thanks Mark. I will be talking to Gene today. I will find out his availability for next Thurs and Fri.

Tim

=

EPA-R5-2013-003300-35

**Mark Hutson**  
<geohydro\_3@geohydro.bizland.com>

01/30/2008 08:55 AM

Please respond to  
geohydro\_3@geohydro.bizland.com

To Timothy Drexler

cc cnorris

bcc

Subject Re: Pines Radionuclide Data

Tim

Any word on when the conference call can take place? The group is ready for sometime on Thursday or Friday, but we need to let them know so they can plan accordingly. I asked Chuck to follow-up with you also since I'm out of the office this week. I'll be able to sit-in if we do it Friday, but will be traveling most of the day on Thursday. Chuck will sit in if it's on Thursday.

Here are the questions that Larry Silvesti sent out to the group help guide our discussion.

- 1.) The responsible parties are establishing "natural background" base line levels for chemicals that rely on soil tests made from samples that may contain flyash contamination.
- 2.) According to the RI/FS maps, some of the "natural background" samples are taken from areas within the Town of Pines and are close to suspected flyash fill. Dust from the filling and transport operations may have blown off and landed on the areas that are being tested as natural.
- 3.) Groundwater may have leached contaminants from filled areas and flowed downhill to areas that are not suspected to be contaminated. High and low groundwater levels may have left contaminants at a range of depths or even on the surface.
- 4.) To avoid confusion as to what are natural occurring chemicals and what is flyash contamination, I think natural background soil tests need to be conducted outside the area of investigation.
- 5.) Some locations outside the Area of Investigation have been reported to contain flyash, but the responsible parties will not test them. Natural background should not be established until we know the locations of flyash contamination. (For example, Islamic Center, 1600N, and possibly other areas if hot spots show up from water testing)
- 6.) What are the answers to Larry Jensen's questions on radionuclides?

Larry also added this observation:

"This quote from the Human Health Risk Assessment is why I think that the natural background tests are important.  
"If Area of Investigation concentrations of constituents are

representative of or consistent with background concentrations ,  
they will not be included in risk calculations."

If you need to talk about anything with me, you can get me on my cell phone  
at 720-329- 2060.  
Talk with you soon.

Mark

Mon Jan 21 21:19 , Drexler.Timothy@epamail.epa.gov sent:

>Hi Mark: I've had a tremendous amount of trouble getting time with our rad  
person.  
Since Larry left, Gene Jablinowski is the only one we have in the Region. He  
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> Tim Drexler  
>Remedial Project Manager  
>Superfund Division  
>United States Environmental Protection Agency  
>77 W. Jackson Blvd., SR-6J  
>Chicago, Illinois 60604-3590  
>  
>phone: 312.353.4367  
>fax: 312.886.4071  
>  
>-----"Mark Hutson" <mhutson@geo-hydro.com> wrote: -----  
>  
>To: Timothy Drexler/R5/USEPA/US@EPA  
>From: "Mark Hutson" <mhutson@geo-hydro.com>  
>Date: 01/18/2008 12:28PM  
>Subject: Pines Radionuclide Data  
>  
>Tim Did you ever get anything from your person who was looking at Larry  
Jensen's  
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week? Mark Hutson Geo-Hydro, Inc. 303-948-1417 mhutson@geo-hydro.com



EPA-R5-2013-003300-36

**Timothy  
Drexler/R5/USEPA/US**  
01/30/2008 09:22 AM

To geohydro\_3  
cc cnorris  
bcc  
Subject Re: Pines Radionuclide Data

Hi Mark and Chuck:

I do not yet have confirmation that the health physicist will be available this week . We will probably have to postpone the rad discussion until next Thursday or Friday . I hope to have clarification today.

However, most of your questions do not relate to the rad issues. They relate to background sampling questions. If you like, I could address the background questions tomorrow or Friday and then schedule the rad issues for next Thurs-Fri. Would that work for you?

-Tim

Mark Hutson <geohydro\_3@geohydro.bizland.com>

**Mark Hutson**  
**<geohydro\_3@geohydro.bizland.com>**

01/30/2008 08:55 AM

Please respond to  
geohydro\_3@geohydro.bizland.com

To Timothy Drexler/R5/USEPA/US@EPA  
cc cnorris@geo-hydro.com

Subject Re: Pines Radionuclide Data

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> Tim Drexler  
> Remedial Project Manager  
> Superfund Division  
> United States Environmental Protection Agency  
> 77 W. Jackson Blvd., SR-6J  
> Chicago, Illinois 60604-3590  
>  
> phone: 312.353.4367  
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> -----"Mark Hutson" <mhutson@geo-hydro.com> wrote: -----  
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>

EPA-R5-2013-003300-37

Mark Hutson  
<geohydro\_3@geohydro.bizland.com>

01/30/2008 09:34 AM

Please respond to  
geohydro\_3@geohydro.bizland.com

To geohydro\_3, Timothy Drexler

cc cnorris

bcc

Subject Re: Pines Radionuclide Data

Tim

That would work for me and I'd like to get the majority of the groups questions answered as soon as we can arrange it. If the health physicist becomes available we can do it all, if not, that part can wait. If you're available Friday I'll be able to be there.

Mark

On Wed Jan 30 8:22 , Drexler.Timothy@epamail.epa.gov sent:

>Hi Mark and Chuck:

>

>I do not yet have confirmation that the health physicist will be available this week. We will probably have to postpone the rad discussion until next Thursday or Friday. I hope to have clarification today.

>

>However, most of your questions do not relate to the rad issues. They relate to background sampling questions. If you like, I could address the background questions tomorrow or Friday and then schedule the rad issues for next Thurs-Fri. Would that work for you?

>

>-Tim

>

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>

Mark Hutson  
geohydro\_3@geohydro.bizland.com

01/30/2008 08:55 AM

Please respond to  
geohydro\_3@geohydro.bizland.com

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc  
cnorris@geo-hydro.com

Subject

Re: Pines Radionuclide Data

>  
>  
>  
>  
>  
>  
>  
>  
>Tim  
>  
>Any word on when the conference call can take place? The group is ready  
>for sometime on  
>Thursday or Friday, but we need to let them know so they can plan  
>accordingly. I asked  
>Chuck to follow-up with you also since I'm out of the office this week.  
>I'll be able to  
>sit-in if we do it Friday, but will be traveling most of the day on  
>Thursday. Chuck  
>will sit in if it's on Thursday.  
>  
>  
>Here are the questions that Larry Silvesti sent out to the group help  
>guide our  
>discussion.  
>  
> 1.) The responsible parties are establishing "natural background"  
> base line levels for chemicals that rely on soil tests made from  
> samples that may contain flyash contamination.  
>  
> 2.) According to the RI/FS maps, some of the "natural background"  
> samples are taken from areas within the Town of Pines and are close  
> to suspected flyash fill. Dust from the filling and transport  
> operations may have blown off and landed on the areas that are  
> being tested as natural.  
>  
> 3.) Groundwater may have leached contaminants from filled areas and  
> flowed downhill to areas that are not suspected to be contaminated.  
> High and low groundwater levels may have left contaminants at a  
> range of depths or even on the surface.  
>  
> 4.) To avoid confusion as to what are natural occurring chemicals  
> and what is flyash contamination, I think natural background soil  
> tests need to be conducted outside the area of investigation.  
>  
> 5.) Some locations outside the Area of Investigation have been  
> reported to contain flyash, but the responsible parties will not  
> test them. Natural background should not be established until we  
> know the locations of flyash contamination. (For example, Islamic  
> Center, 1600N, and possibly other areas if hot spots show up from  
> water testing)  
>  
> 6.) What are the answers to Larry Jensen's questions on  
> radionuclides?  
>  
>Larry also added this observation:  
> "This quote from the Human Health Risk Assessment is why I think  
> that the natural background tests are important.  
> "If Area of Investigation concentrations of constituents are  
> representative of or consistent with background concentrations,  
> they will not be included in risk calculations."  
>  
>

>If you need to talk about anything with me, you can get me on my cell  
>phone  
> at 720-329- 2060.  
> Talk with you soon.  
>  
> Mark  
>  
>  
>  
> Mon Jan 21 21:19 , Drexler.Timothy@epamail.epa.gov sent:  
>  
>>Hi Mark: I've had a tremendous amount of trouble getting time with our  
>rad person.  
>Since Larry left, Gene Jablinowski is the only one we have in the  
>Region. He is  
>unfortunately working on a number of high-level projects. Last week  
>I was finally able  
>to schedule time with Gene this Thursday to talk to him about Larry's  
>rad issues at  
>Pines. I will unfortunately be in Minnesota at another Site all of this  
>week, so I'll be  
>calling him from the field. So, this week I would not be prepared to  
>discuss the issue.  
>I should be available most of next week, though. Give me a couple of  
>dates and times  
>that work for everyone that is interested in participating, and I'll try  
>to get Gene to  
>join me on a call. If I am successful in getting Gene, I can also  
>arrange a call-in  
>phone line. Let me know. Talk to you soon. -Tim  
>> Tim Drexler  
>>Remedial Project Manager  
>>Superfund Division  
>>United States Environmental Protection Agency  
>>77 W. Jackson Blvd., SR-6J  
>>Chicago, Illinois 60604-3590  
>>  
>>phone: 312.353.4367  
>>fax: 312.886.4071  
>>  
>>-----"Mark Hutson" mhutson@geo-hydro.com> wrote: -----  
>>  
>>To: Timothy Drexler/R5/USEPA/US@EPA  
>>From: "Mark Hutson" mhutson@geo-hydro.com>  
>>Date: 01/18/2008 12:28PM  
>>Subject: Pines Radionuclide Data  
>>  
>>Tim Did you ever get anything from your person who was looking at  
>Larry Jensen's  
>comments on the radionuclide data? We got an e-mail from Larry Sylvestri  
>yesterday  
>expressing his concern about the residential soil sampling. I've  
>suggested that we set-  
>up a conference call and talk through the concerns rather than relying  
>on a string of e-  
>mails. Would you be willing to participate? If so, how's your schedule  
>look next  
>week? Mark Hutson Geo-Hydro, Inc. 303-948-1417 mhutson@geo-hydro.com  
>  
>>  
>



EPA-R5-2013-003300-38

**Timothy  
Drexler/R5/USEPA/US**  
01/30/2008 09:51 AM

To geohydro\_3  
cc cnorris  
bcc

Subject Re: Pines Radionuclide Data

Hi Mark:

This Friday, Feb. 1st, right now I'm available any time. Just let me know a number to call unless there are a lot of lines. If there are, I can arrange a conference line. Let me know.

-Tim

Mark Hutson <geohydro\_3@geohydro.bizland.com>

**Mark Hutson  
<geohydro\_3@geohydro.bizland.com>**

01/30/2008 09:34 AM

Please respond to  
geohydro\_3@geohydro.bizland.com

To geohydro\_3@geohydro.bizland.com, Timothy  
Drexler/R5/USEPA/US@EPA  
cc cnorris@geo-hydro.com

Subject Re: Pines Radionuclide Data

Tim

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>relate to background sampling questions. If you like, I could address  
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[illegible]

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>> Remedial Project Manager  
>> Superfund Division  
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>> 77 W. Jackson Blvd., SR-6J  
>> Chicago, Illinois 60604-3590  
>>

>>phone: 312.353.4367  
>>fax: 312.886.4071  
>>  
>>-----"Mark Hutson" mhutson@geo-hydro.com> wrote: -----  
>>  
>>To: Timothy Drexler/R5/USEPA/US@EPA  
>>From: "Mark Hutson" mhutson@geo-hydro.com>  
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>week? Mark Hutson Geo-Hydro, Inc. 303-948-1417 mhutson@geo-hydro.com  
>  
>>  
>  
>  
>

EPA-R5-2013-003300-39

**Charles Norris**  
<cnorris@geo-hydro.com>

04/16/2008 03:11 PM

To Timothy Drexler

cc

bcc

Subject Re: Fw: Pines AOC II Progress Report 4-15-08

Tim,

I was looking at the rad for soil samples and have a few questions.

Do you have handy a cross reference that I can look at for the locations of collection for these samples?

Do the units of activity each represent alpha-activity, regardless of radionuclide? If not, what decay is represented by the activity units reported?

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-40

**Charles Norris**  
<[cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)>

04/16/2008 03:14 PM

To Timothy Drexler

cc

bcc

Subject Re: Fw: Pines AOC II Progress Report 4-15-08

Tim,

I forgot to ask: Rad results really need the uncertainty range reported with the results. Is there, or will there be, a full report that includes those data as well?

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-41

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
04/17/2008 04:58 PM

To Timothy Drexler  
cc cnorris  
bcc  
Subject Weaver Boos arsenic sampling data

Tim

We received the package of Weaver Boos data this morning, thanks for the quick response. Unfortunately, the data collected do not address the original question of whether or not arsenic that is moving with leachate through the shallow groundwater is accumulating in sediment as it encounters geochemical conditions downgradient of fill areas that result in the attenuation of arsenic from groundwater. For some reason Weaver Boos focused their sample collection activities on sampling layers of shallow flyash and deep clay layers which they interpreted as the base of the shallow aquifer.

We are unsure why the basal clayey sediments were targeted, since these sediments are not in the path of flow and would not, therefore, be likely sinks for arsenic in groundwater. Most of the data for the Pines area indicate an upward gradient, precluding flow and arsenic attenuation in that direction. Leachate preferentially flows through the porous sandy soils rather than clays. Landfill leachate would be expected to migrate laterally in the direction of flow through the sand and the attenuation of dissolved arsenic in the groundwater will most likely occur onto iron-oxides in the sandy soils along the path of migration rather than penetrating 20 or more feet vertically through the saturated zone, against the vertical gradient, to encounter and be attenuated on the clay at the bottom of the aquifer.

Having said that, some useful information may be available from this investigation. We note that the boring logs indicate that groundwater samples were collected from near both the top and bottom of the aquifer at each borehole along with the soil samples. Analytical results of the groundwater samples were inadvertently not included or discussed in the Weaver Boos write-up. If you can get those results, it may shed some light on the original concentration of arsenic in leachate as it leaves the landfill and give us an idea of how much arsenic is being removed from the groundwater between the landfill and the closest downgradient monitoring wells. From that data, it may be possible to identify the optimal locations for sampling, within the flow path, for soils with accumulated arsenic concentrations.

This phenomenon might also be easily documented by analyzing the oxide-stained sediments below where leachate discharges from the west flank of Yard 520 along Birch Road and flows down, across the road and into the unnamed tributary of Brown Ditch. Similarly, there are seep discharges on the west side of Birch Road along the ditch bank with the requisite iron precipitation to capture and concentrate arsenic from the discharging leachate.

Please let me know if you have questions.

Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-42

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

05/19/2008 03:54 PM

To Timothy Drexler

cc

bcc

Subject Pines RI Report

Tim

I hear that the RI Report is to be available to download today.

Have the residents received any notice of its availability and instructions on how to get it?

Mark

Mark Hutson

Geo-Hydro, Inc.

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-43

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
05/23/2008 09:51 AM

To Timothy Drexler  
cc  
bcc  
Subject FW: EPA meeting scheduled June 12th.

Tim

Has the time of the June 12th meeting about the PINES RI been determined?

Mark

-----Original Message-----

From: Charles Norris [mailto:cnorris@geo-hydro.com]  
Sent: Thursday, May 22, 2008 8:56 PM  
To: Mark Hutson  
Subject: EPA meeting scheduled June 12th.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-44

**Timothy  
Drexler/R5/USEPA/US**  
05/23/2008 10:33 AM

To "Mark Hutson"  
cc  
bcc  
Subject Re: FW: EPA meeting scheduled June 12th.

Hi Mark:

The meeting will begin at 10 am at EPA's office at 77 W. Jackson Blvd. We will meet on the 6th floor.

"Mark Hutson" <mhutson@geo-hydro.com>

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
05/23/2008 09:51 AM

To Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject FW: EPA meeting scheduled June 12th.

Tim

Has the time of the June 12th meeting about the PINES RI been determined?

Mark

-----Original Message-----

From: Charles Norris [mailto:cnorris@geo-hydro.com]  
Sent: Thursday, May 22, 2008 8:56 PM  
To: Mark Hutson  
Subject: EPA meeting scheduled June 12th.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-45

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**

06/06/2008 02:51 PM

To Timothy Drexler

cc cnorris

bcc

Subject pines groundwater model files

Hi Tim

Have you made any progress on getting hold of the electronic groundwater model files on Pines?  
It's amazing how often what is in the model is not quite the same as what gets translated on paper.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-46

**Timothy  
Drexler/R5/USEPA/US**  
06/17/2008 02:05 PM

To eperry, lbradley  
cc vblumenfeld  
bcc  
Subject Fw: Richardson residence Well Material

FYI.

----- Forwarded by Timothy Drexler/R5/USEPA/US on 06/17/2008 02:04 PM -----

**Timothy  
Drexler/R5/USEPA/US**  
06/17/2008 02:03 PM

To Peggy Richardson  
cc Bob Kay/R5/USEPA/US@EPA, mhutson@geo-hydro.com

Subject Fw: Richardson residence Well Material

Hi Peggy:

After viewing the screen again and observing the material under a microscope myself , I have to agree with Bob's conclusion. I should have looked more closely before I gave my opinion the first time . I'm sorry for my confusion.

Tim Drexler

----- Forwarded by Timothy Drexler/R5/USEPA/US on 06/17/2008 01:57 PM -----

**Bob Kay/R5/USEPA/US**  
06/17/2008 01:46 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject Pines Well Material

Tim--based on the visual anlaysis we did on the well screen material at the site last Friday and the microscope observation of the scrapings from the screen of that well earlier today it looks to me that the material from the well screen is sand grains in a matrix of iron or manganese oxide . None of it has the glassy, vesicular appearance of bottom ash.

Call if you have questions.

EPA-R5-2013-003300-47

"Bradley, Lisa"  
<lbradley@ensr.aecom.com>  
06/17/2008 02:45 PM

To Timothy Drexler  
cc  
bcc  
Subject RE: Richardson residence Well Material

Thanks for the update Tim! :) LIAS

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Tuesday, June 17, 2008 3:05 PM  
To: Perry, Elizabeth; Bradley, Lisa  
Cc: vblumenfeld@bibtc.com  
Subject: Fw: Richardson residence Well Material

FYI.

----- Forwarded by Timothy Drexler/R5/USEPA/US on 06/17/2008 02:04 PM  
-----

Timothy  
Drexler/R5/USEPA  
/US

06/17/2008 02:03  
PM

Peggy Richardson

Bob Kay/R5/USEPA/US@EPA,  
mhutson@geo-hydro.com

To  
cc

Subject  
Fw: Richardson residence Well  
Material

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Tim Drexler

----- Forwarded by Timothy Drexler/R5/USEPA/US on 06/17/2008 01:57 PM  
-----

Bob  
Kay/R5/USEPA/US

06/17/2008 01:46  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject  
Pines Well Material

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Call if you have questions.

EPA-R5-2013-003300-48

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
06/23/2008 02:06 PM

To Timothy Drexler  
cc cnorris  
bcc  
Subject Pines Groundwater Model Files

Tim

We still haven't received the groundwater model files from ENSR.

The end of the month is only a week away and we're running out of time to do a meaningful review.

Can you help us with this? It's really starting to make me think that there is something in the model that they don't want to be seen.

Also, from the discussion in Chicago a couple of weeks ago it is clear that the respondents didn't seriously use the model to investigate the impacts that providing outside water supplies had on the water table around people's houses. Any thought on how we can get this addressed?

Thanks,

Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-49

**Timothy  
Drexler/R5/USEPA/US**  
06/24/2008 03:25 PM

To "Mark Hutson"  
cc cnorris  
bcc  
Subject Re: Pines Groundwater Model Files

Hi Mark:

You should have received the ground water model files. Let me know if you did not. Also, Kevin Herron has requested until July 14th to provide me with IDEM's comments. I agreed, so you have a bit more time to provide me with comments.

I'll discuss your question about the water table impacts with Bob Kay and get back to you .

Tim

"Mark Hutson" <mhutson@geo-hydro.com>

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
06/23/2008 02:06 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc <cnorris@geo-hydro.com>

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Thanks,

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Mark Hutson  
Geo-Hydro, Inc.

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-50

"Mark Hutson "  
<mhutson@geo-hydro.com>  
06/24/2008 03:31 PM

To Timothy Drexler  
cc  
bcc  
Subject RE: Pines Groundwater Model Files

Thanks Tim

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Tuesday, June 24, 2008 2:26 PM  
To: Mark Hutson  
Cc: cnorris@geo-hydro.com  
Subject: Re: Pines Groundwater Model Files

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"Mark Hutson"  
<mhutson@geo-hydro.com>

06/23/2008 02:06  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc  
<cnorris@geo-hydro.com>

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Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
mhutson@geo-hydro.com

EPA-R5-2013-003300-51

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

08/05/2008 10:41 AM

To Timothy Drexler

cc cnorris

bcc

Subject GHI PINES RI Comments

Tim

Chuck said that you would like the Word file of our comments.

Let me know if you need files containing Larry Jensen's comments or the data graphs.

Mark

Mark Hutson

Geo-Hydro, Inc.

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



Comments on the Draft Remedial Investigation Report \_Final.doc

EPA-R5-2013-003300-52

"Mark Hutson"  
<mhutson@geo-hydro.com>  
08/05/2008 10:50 AM

To Timothy Drexler  
cc  
bcc  
Subject RE: GHI PINES RI Comments

Here you go.

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Tuesday, August 05, 2008 9:43 AM  
To: Mark Hutson  
Cc: cnorris@geo-hydro.com  
Subject: Re: GHI PINES RI Comments

Hi Mark. Yeah, if you could send me Larry's comments in Word also, that would be great. I shouldn't need copies of the data graphs.

Thanks.

-Tim

"Mark Hutson"  
<mhutson@geo-hydro.com>

08/05/2008 10:41  
AM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc  
<cnorris@geo-hydro.com>

Subject  
GHI PINES RI Comments

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Mark Hutson  
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303-948-1417

mhutson@geo-hydro.com

[attachment "Comments on the Draft Remedial Investigation Report  
\_Final.doc" deleted by Timothy Drexler/R5/USEPA/US]



**Jensen Review Comments Yard 520 May 19 2008.doc**

EPA-R5-2013-003300-53

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

08/17/2008 03:21 PM

To Timothy Drexler

cc

bcc

Subject Pines Comments

Tim

Did your consolidated comments on the Pines RI go out yet?

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-54

**Timothy  
Drexler/R5/USEPA/US**  
08/18/2008 08:00 AM

To "Mark Hutson"  
cc  
bcc  
Subject Re: Pines Comments

Hi Mark:

The comments are consolidated, but we had some questions regarding Larry Jenson's comments. We sent a couple of questions to Larry last week and are waiting for his response in order to go forward. I hope we get them this week.

-Tim

"Mark Hutson" <mhutson@geo-hydro.com>

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
08/17/2008 03:21 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject Pines Comments

Tim

Did your consolidated comments on the Pines RI go out yet?

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-55

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
12/21/2008 12:18 PM

To Timothy Drexler  
cc  
bcc  
Subject pines groundwater model files

Tim

After reviewing the appendix that contains the groundwater model write-up it is impossible to tell what has changed from the first version, if anything. Can you get us a copy of the model input and output files that we can look at to see what they have done. Note: The table in the first version that tipped us off to the fact that the the model would not calibrate while PZ001 was included is missing from the revised addenda. However, there is a statement that says the model still does not show heads at PZ001 as high as are measured in the field. From the information we have, it's not possible to tell what changes to the model were made.

Thanks,  
Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-56

**Charles Norris**  
<cnorris@geo-hydro.com>

01/15/2009 11:59 AM

To Timothy Drexler

cc

bcc

Subject What to ask with respect to models

Tim,

Please ask for ASCII text files representing all input matrices that are used for at least the base calibration simulation. They also should send output head files in ASCII format. (The head files will allow investigation of discussions of hypotheses like "strong vertical gradients" explaining observations; if real, they will be simulated in the model detail.)

--

Chuck

Charles H. Norris  
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EPA-R5-2013-003300-57

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

01/15/2009 05:12 PM

To Timothy Drexler

cc

bcc

Subject soils data

Mark Hutson

Geo-Hydro, Inc.

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



Background Soils.xls

EPA-R5-2013-003300-58

**Pete\_Penoyer@nps.gov**

01/22/2009 10:36 AM

To Timothy Drexler

cc brenda\_waters, cnorris, eperry, Bob Kay, kherron, lbradley,  
mhutson, Paula\_Cutillo

bcc

Subject Re: Review of ENSR's Pines Site GW model

Tim,

I have 4 or 5 points/comments to make that indicate to me the model is fundamentally flawed and therefore not as credible as it should be. Without sharing these specifics with ENSR in advance, it is difficult to see how these points will be addressed expeditiously and get to the bottom of arriving at an acceptable model and output. I too believe there may have been more time spent on this than was necessary as most points involve basic hydrogeologic principles that in my view have been violated by this model. This is a result of a flawed conceptual model, not checking the model output results to see if they conform to basic hydrogeologic principles of groundwater flow and using a map scale that serves to mask several issues readily apparent in the details (e.g. the base case water table contour map used to calibrate the model). When these fundamental principles are no longer violated, and reasonably conservative parameters are used in line with a "precautionary principle" as one of the model simulation runs, NPS will be prepared to accept the model output as reflecting the appropriate range of possible flow outcomes. We too would like to get this resolved quickly.

regards,  
Pete

Peter E. Penoyer  
Hydrologist, WRD  
1201 Oakridge Dr., Ste. 250  
Ft. Collins, CO 80525  
Ph 970-225-3535  
Fax 970-225-9965  
email: pete\_penoyer@nps.gov

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|-----+----->
|           |           Drexler.Timothy@epam| |
|           |           ail.epa.gov         |
|           |           |                   |
|           |           01/22/2009 09:26 AM |
|           |           CST                 |
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|
|           To:           pete_penoyer@nps.gov, kherron@idem.in.gov,
brenda_waters@nps.gov, mhutson@geo-hydro.com,
|           cnorris@geo-hydro.com
|
|           cc:           kay.bob@epamail.epa.gov, eperry@ensr.com,
```

lbradley@ensr.com |  
| Subject: Review of ENSR's Pines Site GW model  
|

>-----  
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Hi Pines Site GW model reviewers:

In lieu of making all of the gw model files available, Elizabeth Perry would first like to invite you all to participate in a conference so that she and her modeller can interactively present to you the ground water model they developed for the Pines Site. I told her that I had no objection to ENSR working with you directly to set up a convenient date and time, so everyone is cc:ed on this email message. ENSR will copy me when a date and time is set.

I'm, as always in part, concerned with the review schedule for the RI Report, so I would really appreciate it if you could do what you can to help schedule this as soon as possible so that you all can complete your Report review. Once the conference has been held I will contact you to discuss.

Thanks to all of you for your help. Call me if you have any questions.

Tim Drexler

EPA-R5-2013-003300-59

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
01/22/2009 03:20 PM

To Timothy Drexler  
cc  
bcc

Subject RE: Review of ENSR's Pines Site GW model

Tim

Did you mean to say prior to making the files available, or was in lieu of making the files available correct?

Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Thursday, January 22, 2009 8:26 AM  
To: pete\_penoyer@nps.gov; kherron@idem.in.gov; brenda\_waters@nps.gov;  
mhutson@geo-hydro.com; cnorris@geo-hydro.com  
Cc: kay.bob@epamail.epa.gov; eperry@ensr.com; lbradley@ensr.com  
Subject: Review of ENSR's Pines Site GW model

Hi Pines Site GW model reviewers:

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I'm, as always in part, concerned with the review schedule for the RI Report, so I would really appreciate it if you could do what you can to help schedule this as soon as possible so that you all can complete your Report review. Once the conference has been held I will contact you to discuss.

Thanks to all of you for your help. Call me if you have any questions.

Tim Drexler

EPA-R5-2013-003300-60

Charles Norris  
<cnorris@geo-hydro.com>  
01/23/2009 06:43 PM

To "Perry, Elizabeth"  
cc pete\_penoyer, kherron, brenda\_waters, mhutson, Bob Kay,  
Timothy Drexler, "Bradley, Lisa", "Desai, Maya"  
bcc  
Subject Re: Pines groundwater model

Elizabeth,

Let's slow down a little. I think we're getting the cart before the horse to be talking about a scenario meeting.

From GHI's standpoint, the type of session you describe is premature. Based upon what is disclosed in the modeling appendix of the revised RI report, we have serious reservations regarding the fundamental adequacy of the base model. Discussions with other reviewers indicate we are alone in our reservations. Until those reservations are addressed, the scenario meeting you suggest is ill timed. We believe that the first exchange might be a conference call that focuses on providing all parties enough information to evaluate the base model. A follow-on call or meeting to explore scenarios may be beneficial at some point, but only after the adequacy of the base model is established.

Certainly, running simulations through a questionable model can sometimes be useful; I have done it myself to ferret out flaws in a model. But the exercise is risky since the results can be greatly misleading depending upon the nature of the flaws. I believe the type of meeting you describe should wait until everyone is fundamentally comfortable with the model. To do so now creates an inappropriate perception that the model can yield meaningful results for the scenarios that are run. And, for many reasons, I don't believe that it can.

A specific example of the prematurity of a scenario meeting now is the widespread concern with heads in the vicinity PZ001. For me, the concern is not resolved by assigning an a fixed head there in this model, forcing a fit. My concern is that the model does not produce the appropriate head there without that artificial manipulation. Clearly, something is wrong. If the model cannot duplicate known and critical conditions as it is configured and parameterized, what confidence is there in its results in areas where there is no control?

Full disclosure of the input and output files for the base model is the best and simplest way to allow us to reconcile our concerns and, potentially, to suggest changes that would allow them to be addressed. However, you seem hesitant to allow the model to be rigorously reviewed.

A back-and-forth session that explores the existing model with you is a less efficient alternative, but it could resolve some issues and would be probably more efficient than simply submitting comments. Therefore, we would encourage such an initial exchange. We are, however, very hesitant to participate in a meeting that may be perceived or represented later as having addressed everyone's concerns, when in fact it simply ran scenarios that people presented through a model that some don't yet accept.

If you hold the meeting as you propose, I will not ask PINES to use its extremely limited resources to have Mark or me attend in person. We would likely sit in remotely to monitor the meeting, but please

understand that doing so would not constitute acceptance of the model or any results that are generated.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-61

**Pete\_Penoyer@nps.gov**

01/26/2009 12:54 PM

To Charles Norris

cc brenda\_waters, Timothy Drexler, "Perry, Elizabeth", Bob  
Kay, Kherron, "Bradley, Lisa", "Desai, Maya", mhutson

bcc

Subject Re: Pines groundwater model

Thank you Chuck,

We could not concur more with what you said in your email below other than I think you meant to say you were not alone in your reservations discussed among stakeholders as I think that call came to a consensus rather quickly among parties that several apparent flaws and inconsistencies in the ENSR base case calibration model either needed correcting or a sound, scientific-based explanation. NPS agrees running additional simulations at this time from the base case calibration model is not the issue as the water table base case contour map used in the calibration fit is much of the issue. A significant part is 1) how the contouring of the base case model was arrived at vs the error determined for each well as there is poor agreement when interpolating between head values at wells and the contours 2) why the apparent error between interpolation from contours and actual water table elevation heads (from wells) used in the calibration do not agree with the calculated error, 3) why we are able to construct a local water table gradient at the North Landfill based on three, closest, nonlinear wells (PZ-001, MW-2/P-2, and P-10) that reflect a gradient direction that is 180 degrees from the flow direction that was an output of the ENSR model, 4) how is the ENSR groundwater high sustained with recharge when located against the barrier wall and under the landfill cap when both are deemed to be of little or no flow (cap and barrier wall are treated as low or having no permeability) and the model shows all flow is away from this ENSR high? etc. We believe a better explanation is groundwater flow is toward this barrier wall from the crest of the North Landfill best visualized in the Appendix Z Topo Base map (enlargement) where such details are more apparent and groundwater contours that parallel topography should be a basis for the conceptual model lacking additional well data interior to the North Cell.

We continue to believe that much of the apparent error in the base case water table contour map (Figs. 4-3, 4-4, & 4-5) used in the calibration fit is easily resolved by contouring the water table mound at/beneath the crest of the North Landfill indicated by PZ-001, as a linear local divide with radial groundwater flow from that feature (i.e. a groundwater contour closure generally conforms to the topography of the North Landfill as a result of a "capillary effect" acting upon the "silt to clay size glass beads" ). This will avoid the problems we see in the base case calibration model, better fit the head data that ENSR has generated for the site and be the better starting point for flow simulations.

Because the North Landfill is the largest mass of CCBs in the area that are relatively uncontained, getting the base case groundwater model correct in this area is most critical for understanding longer term effects of this feature on the post-MWS installation groundwater flow system.

In checking ENSR output one example of an apparent inconsistency related to 2) above:

The table entries below (from Table 4-2) points out these inconsistencies in the area (COC source) one would think most effort would be made to ensure greatest accuracy between the Observed GW elevation and the elevation interpolated from the calibration base case contour.

Meas. Loc.	Obser. GW	Model	Diff. Between	Reasonable
Diff. Between	Elev.	Simulated	Obser. &	Interpolated
Contour Value	(AVG.)	GW Elev.	Simulated	Value (from
Fig.   & Observed	(ENSR)	(ENSR)	(ENSR)	4-5 contour
map)	GW Elev.			
-----+-----+-----+-----+-----				
---+-----				
PZ-001	621.77	621.38	-0.39 feet	618.5 ± 0.2
feet	- 3.3 feet			
	feet	feet		
-----+-----+-----+-----+-----				
---+-----				
MW-2/P-2	616.06	616.99	0.93 feet	619.7 ± 0.2
feet	+ 3.6 feet			
	feet	feet		

Note for two wells relatively close together the error determined from interpolation between the wells and the contours is relatively large and the sign/error is opposite (direction) based on the base case contouring that would indicate the contour model is a poor fit for the source area. Over the several monthly events of recorded head data, actual head elevations for P2 are never close to the 620 foot contour that is shown in Figure 4-4 indicating it is not near a closed groundwater high as depicted in the ENSR model. Rather it is near a water tabel low caused by the drainage ditch (topo low) separating the North from the South landfill where this well is located.

I hope this helps to clarify things just a bit (avoid the two ships passing in the night problem) and the table is not messed up by the email transmission.

regards,  
Pete

Peter E. Penoyer  
Hydrologist, WRD  
1201 Oakridge Dr., Ste. 250  
Ft. Collins, CO 80525  
Ph 970-225-3535  
Fax 970-225-9965  
email: pete\_penoyer@nps.gov

|-----+----->

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|           | Charles Norris |
|           | <cnorris@geo-hydr|
|           | o.com>           |
|           | 01/23/2009 05:43 |
|           | PM MST           |
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|
|
|           To:           "Perry, Elizabeth" <Elizabeth.Perry@aecom.com>
|
|           cc:           pete_penoyer@nps.gov, kherron@idem.in.gov,
brenda_waters@nps.gov, mhutson@geo-hydro.com,
|           kay.bob@epamail.epa.gov, Drexler.Timothy@epamail.epa.gov, "Bradley,
Lisa" <Lisa.Bradley@aecom.com>, "Desai, Maya" |
|           <Maya.Desai@aecom.com>
|
|           Subject:      Re: Pines groundwater model
|
>-----
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Elizabeth,

Let's slow down a little. I think we're getting the cart before the horse to be talking about a scenario meeting.

From GHI's standpoint, the type of session you describe is premature. Based upon what is disclosed in the modeling appendix of the revised RI report, we have serious reservations regarding the fundamental adequacy of the base model. Discussions with other reviewers indicate we are alone in our reservations. Until those reservations are addressed, the scenario meeting you suggest is ill timed. We believe that the first exchange might be a conference call that focuses on providing all parties enough information to evaluate the base model. A follow-on call or meeting to explore scenarios may be beneficial at some point, but only after the adequacy of the base model is established.

Certainly, running simulations through a questionable model can sometimes be useful; I have done it myself to ferret out flaws in a model. But the exercise is risky since the results can be greatly misleading depending upon the nature of the flaws. I believe the type of meeting you describe should wait until everyone is fundamentally comfortable with the model. To do so now creates an inappropriate perception that the model can yield meaningful results for the scenarios that are run. And, for many reasons, I don't believe that it can.

A specific example of the prematurity of a scenario meeting now is the widespread concern with heads in the vicinity PZ001. For me, the concern is not resolved by assigning an a fixed head there in this model, forcing a fit. My concern is that the model does not produce the appropriate head there without that artificial manipulation. Clearly, something is wrong. If the model cannot duplicate known and critical conditions as it is configured and parameterized, what confidence is

there in its results in areas where there is no control?

Full disclosure of the input and output files for the base model is the best and simplest way to allow us to reconcile our concerns and, potentially, to suggest changes that would allow them to be addressed. However, you seem hesitant to allow the model to be rigorously reviewed.

A back-and-forth session that explores the existing model with you is a less efficient alternative, but it could resolve some issues and would be probably more efficient than simply submitting comments. Therefore, we would encourage such an initial exchange. We are, however, very hesitant to participate in a meeting that may be perceived or represented later as having addressed everyone's concerns, when in fact it simply ran scenarios that people presented through a model that some don't yet accept.

If you hold the meeting as you propose, I will not ask PINES to use its extremely limited resources to have Mark or me attend in person. We would likely sit in remotely to monitor the meeting, but please understand that doing so would not constitute acceptance of the model or any results that are generated.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-62

**Pete\_Penoyer@nps.gov**

01/26/2009 06:25 PM

To "Perry, Elizabeth"

cc brenda\_waters, "Charles Norris", Timothy Drexler, Bob Kay, kherron, "Bradley, Lisa", "Desai, Maya", mhutson

bcc

Subject RE: Pines groundwater model

Hi Elizabeth,

What's going on inside the model should prove enlightening, however the first issue from the NPS perspective is the starting point for the calibrated model and the viewpoint that contradictions in how you have interpreted your own data suggests the groundwater high is misplaced and that shows up in the violations of groundwater flow principles in the model output and the poor agreement between interpolated heads at wells and the base case contour map. I thought that was made pretty clear in our summer meeting at EPA HQ. I think we were all a little surprised to see the final RI not address at least some of these points, so maybe you could respond to the few points I made in my last email. We would like to see these technical issues resolved quickly and move on.

I also anticipate there is a strong NE component or bending of the groundwater flow paths toward the ditches in this NE direction (as the model indicates so that is not an issue), but the starting point for your base case calibration of heads upon inspection of the details and the conceptual model upon which it is based appears flawed. Thus, I am left with the question as to whether the NW component of groundwater flow/flowpaths (if any) is as weak or occur as rarely (limited scenarios in which it occurs) as your model depicts when the base case contour map appears flawed or continues to violate some basic flow principles.

Our best days for the Webex/call are Wed. this week and Monday of next and it would be helpful if you checked the points I made in my last email to see if you also see the same inconsistencies, so these could be addressed by email response ahead of the call. ENSR installed a second borehole adjacent to PZ-001 (when the original drilling log was lost). That would have been an excellent opportunity for ENSR to confirm the strong downward vertical gradients that you hypothesize exists with some hard data from a well/piezometer pair. While your discussion of vertical gradients based on the Freeze and Cherry reference are certainly plausible, they should be confirmed with site data. How this would entirely negate a south to southwesterly horizontal flow component based on the apparent gradient (apparent dip of the water table) between PZ-001 and MW-2/P-2 (true dip of water table appears SSW between PZ-001, MW-2/P-2 and P-10) also remains unclear from your discussion.

Thanks & regards,  
Pete

Peter E. Penoyer  
Hydrologist, WRD  
1201 Oakridge Dr., Ste. 250  
Ft. Collins, CO 80525  
Ph 970-225-3535  
Fax 970-225-9965  
email: pete\_penoyer@nps.gov

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|----->
|          "Perry,
|          Elizabeth"
|          <Elizabeth.Perry@
|          aecom.com>
|
|          01/26/2009 04:26
|          PM EST
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|
|          To:          "Charles Norris" <cnorris@geo-hydro.com>
|
|          cc:          <pete_penoyer@nps.gov>, <kherron@idem.in.gov>,
|          <brenda_waters@nps.gov>, <mhutson@geo-hydro.com>,
|          <kay.bob@epamail.epa.gov>, <Drexler.Timothy@epamail.epa.gov>,
|          "Bradley, Lisa" <Lisa.Bradley@aecom.com>, "Desai,
|          Maya" <Maya.Desai@aecom.com>
|
|          Subject:     RE: Pines groundwater model
|
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|----->
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Chuck - Thanks for your input. Our intention on the scenarios was not to develop predictive simulations, but rather to allow everyone a chance see what's going on in the model. To do the types of evaluations you mention.

So, we'd still like to plan a meeting or webex on this subject. Can everyone provide information about their availability for next week? It looks like we'll be having a storm on Wednesday this week.

Mon or Tues (Feb 2, 3), between about 11am and 5pm Eastern  
Wed the 4th, 1pm-5pm Eastern  
For a 2-3 hr duration

Thanks!  
Elizabeth

-----Original Message-----

From: Charles Norris [mailto:cnorris@geo-hydro.com]  
Sent: Friday, January 23, 2009 7:43 PM  
To: Perry, Elizabeth  
Cc: pete\_penoyer@nps.gov; kherron@idem.in.gov; brenda\_waters@nps.gov; mhutson@geo-hydro.com; kay.bob@epamail.epa.gov; Drexler.Timothy@epamail.epa.gov; Bradley, Lisa; Desai, Maya  
Subject: Re: Pines groundwater model

Elizabeth,

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horse to be talking about a scenario meeting.

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any results that are generated.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue

Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-63

"HERRON, KEVIN"  
<KHERRON@idem.IN.gov>

01/28/2009 02:07 PM

To Brenda\_Waters, "Perry, Elizabeth"

cc cnorris, Timothy Drexler, Bob Kay, "Bradley, Lisa", "Desai, Maya", mhutson, pete\_penoyer

bcc

Subject RE: Pines groundwater model

My Hydrogeologist has a prior commitment on Wednesday afternoon. He would be the IDEM staff that would be best to participate, so I guess February 4 does not work for IDEM.

-----Original Message-----

From: Brenda\_Waters@nps.gov [mailto:Brenda\_Waters@nps.gov]

Sent: Wednesday, January 28, 2009 10:05 AM

To: Perry, Elizabeth

Cc: cnorris@geo-hydro.com; Drexler.Timothy@epamail.epa.gov; kay.bob@epamail.epa.gov; HERRON, KEVIN; Bradley, Lisa; Desai, Maya; mhutson@geo-hydro.com; pete\_penoyer@nps.gov

Subject: RE: Pines groundwater model

Elizabeth,

I will be unable to participate in the meeting on Feb. 4 as I am out of the office all next week. Pete Penoyer will represent Indiana Dunes National Lakeshore from NPS. (Thanks, Pete!)

Sincerely,

Brenda

\*\*\*\*\*

Brenda Waters

Assistant Chief of Natural Resources

Indiana Dunes National Lakeshore

1100 N Mineral Springs Road

Porter, IN 46304

Office: (219) 395-1552

Fax: (219) 395-1588

\*\*\*\*\*

"Perry,

Elizabeth"

To:

<pete\_penoyer@nps.gov>, <kherron@idem.in.gov>, <brenda\_waters@nps.gov>,

<Elizabeth.Perry@

<mhutson@geo-hydro.com>,

<cnorris@geo-hydro.com>, <kay.bob@epamail.epa.gov>,

aeacom.com>

<Drexler.Timothy@epamail.epa.gov>

cc: "Bradley, Lisa"

<Lisa.Bradley@aeacom.com>, "Desai, Maya"

01/28/2009 08:42

<Maya.Desai@aeacom.com>

groundwater model

AM EST

Subject: RE: Pines

From the responses so far, Wednesday afternoon is looking the best (Feb 4), sometime about 1-4pm Eastern. It will be a webex, a meeting you can participate in using your computer internet connection and telephone.

Kevin, we haven't heard from you - does this time work?

Tim and Bob - I assume we won't hear from Bob this week because he's traveling? And Tim, were you planning to participate?

Thanks everyone!  
Elizabeth

---

From: Perry, Elizabeth  
Sent: Friday, January 23, 2009 2:09 PM  
To: pete\_penoyer@nps.gov; kherron@idem.in.gov;  
brenda\_waters@nps.gov;  
mhutson@geo-hydro.com; cnorris@geo-hydro.com; kay.bob@epamail.epa.gov;  
'Drexler.Timothy@epamail.epa.gov'

Cc: Bradley, Lisa; Desai, Maya  
Subject: Pines groundwater model

In order to address continuing concerns with the groundwater modeling for the Pines Area of Investigation, we're going to set up a meeting or webex.

During the meeting, we can work interactively with the model. I'd like feedback on everyone's availability over the next couple of weeks for a meeting (in Chicago or Boston) or webex, and requests for specific simulations that we can set up in preparation.

We had a similar meeting with Bob Kay earlier this week. Bob requested that we set up scenarios that create a gradient from PZ001 to the south (towards the wall between the north and south areas of Yard 520). We ran the following simulations:

- constant head of 616 ft along the wall separating the north and south areas of Yard 520
- high K along the wall
- constant head of 621 ft in Layer 1 in the vicinity of PZ001
- constant head of 621 ft in Layers 1, 2, 3 in the vicinity of PZ001
- constant head of 621 ft in Layers 1-4 in the vicinity of PZ001
- Simulations D and H under each of these scenarios

We can review these results, and other simulations of interest. While we will certainly work interactively during the meeting, it would be much more effective if we could also prepare anticipated simulations prior to the meeting. So please provide requests and suggestions.

In terms of scheduling, let us know your availability for travel and/or an internet meeting at the following times. We should probably plan to spend about 2-3 hours.

- Wed next week (Jan 28), approximately 11am Eastern
- Mon, Tues or Wed the following week (Feb 3), between approximately 11am and 5pm Eastern

Elizabeth

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EPA-R5-2013-003300-64

**Pete\_Penoyer@nps.gov**

01/30/2009 01:13 PM

To "Perry, Elizabeth"

cc brenda\_waters, cnorris, Timothy Drexler, Bob Kay, kherron,  
"Bradley, Lisa", "Desai, Maya", mhutson

bcc

Subject Re: Pines groundwater model

Elizabeth,

There appear to be at least two ways to get the calibrated base case model output (contours) to arrive at a better/more representative fit in the area of the North Landfill cell (CCB source). This could give us more confidence in the output and result in water table contours of the base case better fitting the elevation heads observed in the wells and make the resulting simulations more credible.

1) Tweak some of the parameters such as Hydraulic Conductivity/fix heads at certain well locations/in selected areas as Bob Kay is doing below to the existing ENSR calibrated model which I agree will likely have the desired effect to some degree.

2) Employ the concept of "capillary effect" in the base case contouring that will result in contouring of the water table mound under the North Cell to conform with the topography of the North Landfill cell (while honoring your same data set) and using that contour map as the observed water table contour configuration to recalibrate the model to and arrive at a new simulated base case (fig. 4-4). Note that your current 620 foot contour that closes against the South cell barrier wall from the North, runs perpendicular to a fairly steep topographic slope of the North Landfill and is perpendicular to/crosses the ditch (topo low) separating the two landfills (see Appendix Z detailed topo map). It is highly unusual for groundwater contours to do this (run perpendicular to topographic slope in humid areas) and such an orientation perpendicular to topographic slope is not replicated anywhere else in the entire investigation area that I could see.

NPS believes using approach 2) will ultimately result in the best calibration fit and basis for determining how well simulated groundwater elevations fit the observed and developing the model derived parameters that lead to the "best fit", particularly at the source where the calibrated model fit to wells PZ-001, MW-2/P-2 and P-10 are most critical in determining the simulated flow paths under the various scenarios. For whatever reason, ENSR appears unwilling to do this despite sound hydrogeologic rationale that would support such an approach and the apparent model output of ENSR that violates some fundamental hydrogeologic principles.

You asked for suggestions:

Thus, our first preference would be rerunning the base case calibration employing the principle of "capillary effect" in your conceptual model to the north cell topography, similar to the application of this principle in the dune ridges where greater well control forces the model to invoke this principle in developing divides/water table mounds beneath the topographically high dune ridges. This would be done by:

1) Place a second "hypothetical well/piezometer" at the true "top" of the

North Landfill ~ 500 feet west of PZ-001 in the center of the topographic closure shown in Appendix Z. This would be 3 to 4 feet topographically higher and avoid the edge effect on the water table in the placement of PZ-001 near the margin of the high, so the elevation head would be expected to be two or more feet higher. Apply a same fixed 621.77' (or 622 feet rounded) elevation head for PZ-001 and a 624' average elevation groundwater head for this second topographically higher location (call it PZ-200). Because ENSR did not place PZ-001 at the true "top" of the north landfill as EPA directed, this hypothetical well placement together with PZ-001 should better represent the linear divide under the North cell and will force your computer generated contouring to behave properly which was not done in part due to limited control. (I believe ENSR/PRPs argued against any additional control interior to the North Landfill cell in the workplan and a second well/piezometer placed here would likely have avoided many of the issues we now face).

2) Change/increase the Yard 520 CCBs (Layers 1,2,3) input Parameters (see Table 4-1) from  $K_h = 0.0003$  and  $K_v = 0.0003$  ft./day to  $K_h = 0.005$  and  $K_v = 0.001$  ft./day and hold these parameters fixed or constant as the ENSR model derived values (equal to the upper range for marine clay) as the model generated best fit appears unreasonably low (see rationale below & Freeze and Cherry reference). These parameter changes should also lower the (too) positive heads that the current model generates at P-10 and MW-2/P-2.

3) Double the recharge through the cap at Yard 520 (Table 4-1) by increasing from ( $<1$ "/ yr. or  $0.00021$  ft/day) to  $0.00042$  ft/day and hold this parameter fixed or constant (see rationale below, this value may still be too low and no percolation or other tests were performed on the current landfill cap to support such a low recharge value for the 20 year old cap)

4) Remove the MWS-related recharge (that was evenly distributed throughout MWS service area) in the Southwesternmost portion of the Municipal Water Service Area (triangular shaped ~14 acres (1000 ft. E-W along North cell property boundary x 800 ft. N-S along west boundary of MWS service area x  $1/2$  to get square footage of triangular area) of land where few houses exist immediately NW of Yard 520 & parallel to the property line). Use the lesser wetland calibrated recharge value of  $0.0015$  for this area instead of the  $0.0025$  ft/day recharge value of the MWS service area. The current model likely applies too high a recharge for that area and it will cause a false rise in the simulated water table that should not exist here (see Fig. 1-1). Note that the simulated heads in the wells in this area to the NW are all positive (+) relative to the observed and this error could be attributed to ENSR's even distribution of additional MWS-related recharge where few houses exist inside a portion of the MWS service area. The current base case simulation would also overly accentuate any marginal/subtle hydraulic barrier/divide in this NW direction and that would also overly accentuate the curving of flow paths to the NE from Yard 520 in the model base case.

5) I don't believe there is an easy way to deal with E) discussed below as the model does not appear to allow for addressing spatial heterogeneity's and variation in hydraulic conductivity within the same designated unit (such as the Dune sands) but using too high a  $K_h$  for the surficial aquifer in this area to the NE (dune sands) coupled with an inability to handle an area of less saturated thickness of the thinner aquifer would also tend to curve (bias) the simulated flow paths in this direction as ENSR maps demonstrate. Is not clear if your current model handles this bias issue properly.

6) There should be good flow parallel to the south Landfill Barrier wall in the surficial aquifer toward the ditch on each end of the wall and it is not clear if the current ENSR model applies the Dune sand hydraulic conductivity ( $K_h = 25$  ft/day) to Layer 4 in this sand in this area (as Bob Kay also suggested). One to two rows of cells (covering a distance of 80 to 160 feet north of the wall) in the model should apply this  $K$  value in this area if the heads in P-2 and MW-2/P-2 (located next to the wall) are too difficult to fit because of (too) positive values as applying the dune sand conductivity should permit lowering of the head to reach a better fit in these wells than the ENSR model was able to achieve. The increased  $K_h$  value (to 0.005 ft/day above) applied in to Layers 1,2,3 for the Yard 520 CCBs should also help to alleviate (lower) this misfit of positive heads in P-10 and MW-2/P-2 wells.

Now - recalibrate the model (perform a new calibration fit) with the fixed/constant parameters as specified above to determine the base case best calibration fit to the average heads you have listed in Table 4-2, allowing the remaining unfixed parameters (and using the other site determined values ENSR previously had fixed such as the  $K_h$  and  $K_v$  for the dune sands/other units) to adjust themselves to obtain a best fit to the well average elevation heads. Regenerate a new Figure 4-4 (Base Case Simulated GW Elevation Detail W/ Flowpaths) and a new Table 4-1 (Calibrated Model Inputs - Appendix L) so the output and input of the ENSR model effort and this model effort (map and table) may be compared before running any simulations.

This should result in radial flow from the north landfill topographic high with a curvature of flow paths to the NE but probably not to the same degree you have shown in your model.

Notwithstanding these reservations, we agree that Bob Kay's approach below has some merit in that it should in effect mimic the true condition or establish radial flow off the crest of the North Landfill topographic high both southward toward the barrier wall of the South Cell (possibly creating a smaller but real groundwater high/closure where yours currently is where the ditch is topographically highest) and also retain a northward flowpath as before (i.e. establish a linear, local divide at this location under the crest of the North cell as the PZ-001 data point suggests. The determination of the water table plane/gradient in this area on the basis of these three wells also supports a SSW gradient as I mentioned in previous emails, compatible with a high under the crest of the North Landfill. Similarly, increasing the hydraulic conductivity as Bob suggests in the saturated layers for 1 to 2 rows of cells parallel to the South barrier wall and extending this condition toward the ditches at each end of the barrier wall should have the effect of lowering the simulated heads in P-10 and MW-2/P-2 (allow more easily a draindown of the water table in this area). These heads were previously too high in the simulated model (+1.71 feet and +0.93 feet respectively; Table 4-2) so need to be reduced in some manner.

While simulations of D and H under these tweaked hydraulic conductivity and fixed head conditions seem appropriate, we can't get away from the other model based parameter selections as best fits based on a flawed base case groundwater contour map at this primary source of contamination. Thus our first preference remains as stated above.

NPS recognizes that arriving at any groundwater model fit to within 10% of the observed heads can be very challenging and requires considerable effort on the part of the modeler and in selection of a reasonable range of

parameter values to test. In our view it is likely that misplacement of the groundwater high as a result of the flawed ENSR conceptual model is the cause of contouring problems and poor contour fits with well elevation heads interior to the North Landfill. NPS did not see a table that provided the range of parameter values tested in arriving at the Calibrated Model Inputs of Table 4-1. For example, from Table 4-1, the Kh and Kv values for Yard 520 CCBs are listed as being the same 0.0003 ft/day. Converting this hydraulic conductivity value to units of cm/sec ( $1.05 \times 10^{-7}$ ) and comparing to Table 2-2 of p. 29 Freeze and Cherry (1979) for Range of Hydraulic Conductivities (for rocks and unconsolidated deposits) suggests the Yard 520 fly ash conductivity is in the range of an unweathered marine clay (upper end), glacial till (mid range), or silt, loess (low end) material. While it is acknowledged that fly ash can have quite low hydraulic conductivity and this is to some degree dependent on the fly ash type (pozzolanic or cementitious) and other considerations (e.g. degree of compaction/ initial water content etc., this appears to be an extremely low model-derived(?) value and suggest some other parameter may be in error to compensate for this. In contrast, the Kh model calibrated value for CCB fill areas used by ENSR outside Yard 520 is 25 feet/day or nearly 5 orders of magnitude larger. There is reasonable rationale to explain some difference but this much a difference in hydraulic conductivity of the same material seems unwarranted.

One driver in using/determining this low a value in reaching a calibrated model best fit is likely PZ-001 which has a lower than observed or negative elevation head (-0.39 feet) fit relative to the observed. By keeping the Kh low for the CCBs, higher heads are maintained and a desired better model fit is the outcome at the PZ-001 data point. However, a similar model fit may be obtained by increasing the Kh of Yard 520 CCBs 1/2 to 1 order of magnitude (likely more in line with the actual hydraulic conductivity of the fly ash) and increasing the recharge through the cap (e.g. doubling from 0.00021 ft/day to 0.00042 ft./day or more). Other parameter adjustments/shifts of this nature could lead to an equal or better parameter fit to that of ENSR's locally in Yard 520 but we do not have the range of values tested in conjunction with each other parameter value to determine this, nor do we know what effect the misplacement of the groundwater high (against the barrier wall instead of conforming to the topography of the North Landfill) in the base case flow model has on the selection of incorrect parameters by the model or the resulting simulated flow scenarios (NPS primary concern being an accurate depiction of the source area and obtaining the best model fit in the North Cell to determine future flow paths originating from the groundwater high located there).

Therefore, if we are limited to only tweaking the existing model (in lieu of recontouring the base case groundwater contour map to fit a model based on the "capillary effect" of fine-grained fly ash as our preference would be above as our first choice) to potentially achieve a better fit between the observed heads in Yard 520 with those simulated, a second option would be the following:

Simulation H Run with the following combined parameter changes :

A) - constant head of 622 ft in Layers 1-4 in the vicinity of PZ001 (Note PZ-001 was not located at the very top of the landfill and a higher groundwater level should be expected along the crest 500 or more feet to the west beneath the 3 to 4 ft. higher topographic top/closure that is more centrally located). A downward gradient is possible but no actual site data exists to support this hypothesis of ENSR so keep the head the same in all 4 layers (several monitoring events have higher than 622 foot elevation heads so this may not even be conservative enough).

B) - double recharge through the Yard 520 cap to 0.00042 ft./day from 0.00021 ft./day (the seasonal rise/fall in water levels in wells particularly at the top/crest of the landfill suggest that <1" in recharge is too low and possibly significantly low (along with many other factors, considering grass cover limiting runoff, root holes increasing infiltration compared to the unvegetated, initial compacted clay cap and freeze/thaw and desiccation/shrinkage-caused cracking of the clay/loam over a 20 period since cap installation)).

C) - For Yard 520 CCBs use a  $K_h$  of 0.005 ft./day and a  $K_v$  of 0.001ft./day in Layers 1, 2, and 3 (for the North cell these should be pozzolanic CCB's from higher sulfur/local coals, appear unconsolidated from the drillers logs and therefore not as low permeability as the cementitious CCB's of the South Landfill from combustion of western sourced low sulfur coals - unlike a true clay composed of tabular particles, these North cell CCBs are "silt and clay sized glass beads" (rounded) so of better hydraulic conductivity than silt/clay materials are ordinarily (unless highly cemented, which I have not seen evidence for)).

D) - Remove the MWS-related recharge (evenly distributed) in the Southwesternmost portion of the Municipal Water Service Area (triangular shaped ~14 acres (1000 ft. x 800 ft. x 1/2) of land where few if any houses exist immediately NW of Yard 520 & parallel to the property line). Use the wetland calibrated value of 0.0015 for this area instead of the 0.0025 ft/day recharge value of the MWS service area. ENSR's evenly distributed recharge approach likely adds too much recharge for this area and it will falsely cause a rise in the simulated water table that should not exist here (see Fig. 1-1). Note that the simulated heads in the wells in this area are all positive (+) relative to the observed and the error could be attributed to ENSR's even distribution of additional MWS-related recharge where few houses exist inside the MWS service area. The current base case simulation would also falsely accentuate any marginal hydraulic barrier/divide in this NW direction and that would falsely accentuate the curving of flow paths to the NE from Yard 520.

E) The current calibrated model does not appear to take into account areal/spatial heterogeneity's in the more hydraulically conductive dune sands of the surficial aquifer but instead applies a constant  $K_h$  of 25 ft./day for the dune sands. For example, higher transmissivities of the surficial aquifer sands are apparent in the NW direction [ $\text{hydraulic conductivity (K)} \times \text{saturated thickness (b)}$  or  $K_b$ ] relative to those in NE direction where (figure 3-12) the aquifer sands of wells TW-18D, MW-6, MW-11 and MW-122 from slug tests are less hydraulically conductive. Despite this area of lesser  $K$ 's, the NE flow is unaffected because the same average value for dune sands is used throughout the model for dune sands. The model output showing strong NE flow should be influenced by this heterogeneity in the aquifer hydraulic conductivity data (better hydraulic conductivities in the NW direction than in the NE direction based on the well data from Fig. 3-12), but is not. Based on the data from these above listed wells to the NE, treating the surficial aquifer as Sub-Wetland Sands with a  $K_h$  of 10 and a  $K_v$  of 1 ft./day (instead of dune sands) would be more representative and by not doing that enhances the NE flow even further in the base case model and subsequent simulations using the base case. Based on Fig. 3-1 (TW-18) these sands in this area are treated in the model as dune sands with a  $K_h$  of 25 ft./day despite all 4 wells being essentially 1/2 or less that  $K_h$ .

Note: A better understanding of what effects to anticipate by changing parameter values would be more apparent if Figure 6-1 "Results of the Sensitivity Analysis" had (+) or (-) designation at the top of each vertical bar (of the graph) so one would be able to tell if the sign of the Mean (Absolute) Error was from a preponderance of positive or negative values. For example, did the "Former use of Private Wells" result in simulated heads on average, being too high (+) or too low (-) compared to the observed (understanding that at a specific well the value could have an opposite sign than that for the average of wells). If such a table was generated for the wells (3 or more key wells) interior to Yard 520 only, one could quickly see what adjustments could be made to arrive at a better simulated model fit at the source area which is most important as the starting point for the downgradient movement of COCs in groundwater and the simulations going forward.

A critical factor in determining if groundwater flow in the NW direction from Yard 520 is more prevalent than the model simulations suggests is through placement of the 616 foot contour in Figure 4-4 (simulated base case) and the observed vs simulated heads for wells MW-102, MW-124, MW-116, TW-14S and MW-1. It's noted that the simulated base case model output generates higher/more positive heads for all these wells than the observed/actual heads in this NW direction. Higher than actual heads in these wells in the simulated base case would accentuate any hydraulic barrier and tend to drive/curve groundwater flow paths to the NE, or create a stronger hydraulic divide in the simulated output and applied to the subsequent simulations than actually exists using the true/observed values. This is the direction of the remaining domestic wells and the likely flow path for the Yard 520 plume to first reach Indiana Dunes N. L. from the Yard 520 source. To be protective, it would be better if the simulated head differences (error) were negative for these wells. Thus the current model shows a stronger hydraulic barrier (flow divide) represented in the base case model output than what is actually there in the real data and the subsequent model simulations will reflect this somewhat biased starting point condition as well.

Maybe a model run should be made by reducing the positive heads in all these wells in the NW direction listed above by 1 foot to generate a slight bias that is more protective instead of one that is less protective/conservative as a flow path developed in this direction is of most concern to everyone?

It seems that the more I get into the details of the ENSR model, the more red flags are raised, giving me less confidence in your model simulation outputs. This is but one more.

In summary: the current groundwater model appears to possibly accentuate NE flow at the expense of NW flow from Yard 520 by the following:

- 1) failing to place the groundwater high at the proper location and configuration beneath the topographic high of the North Cell
- 2) consistently applying positive heads to wells in the NW direction (compared to actual) derived in the base case calibrated model, thereby enhancing development of a subtle divide (if any) than is real or manufacturing one that did not exist and perpetuating it through subsequent simulations
- 3) applying an average hydraulic conductivity of 25 ft./ day to all dune sands of the surficial aquifer when spatial heterogeneity's indicate in a NW direction the Kh values are greater (and sands are thicker also) than in a NE direction where the Kh values are less and the sand saturated thickness is thinner (i.e. toward the ditches) see Fig 3-12 and borehole logs (MW-11, MW-122 & MW-6).
- 4) evenly distributes recharge across the MWS service area when immediately NW of Yard 520 in a 14 acre area there are few houses so falsely raises the water table in this area to inhibit groundwater flow in this direction
- 5) underestimates recharge through the landfill cap resulting in the model's under fit of the elevation head of PZ-001 (-0.39 feet) even when this well is not located at the top of the landfill where a higher observed average head would be expected
- 6) likely applies too low a hydraulic conductivity for the unconsolidated, pozzollanic flyash of the North cell (unconsolidated glass beads of silt to clay size should not equate to a marine shale)

regards all,

Pete

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Fax 970-225-9965  
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|-----+----->
|         |      "Perry,      |
|         |      Elizabeth"   |
```



- Mon, Tues or Wed the following week (Feb 3), between approximately 11am and 5pm Eastern

Elizabeth

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EPA-R5-2013-003300-65

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
02/03/2009 02:53 PM

To "Perry, Elizabeth"  
cc mhutson, pete\_penoyer, Bob Kay, "HERRON, KEVIN",  
"Bradley, Lisa", "Desai, Maya", Timothy Drexler,  
Brenda\_Waters  
bcc

Subject Materials for the PINES model meeting

Elizabeth,

Please verify that the Global and List files you previously sent out for the 17 October 2007 MODFLOW simulation are representative of the base model that is discussed in the revised RI report, Appendix L.

My concerns at this point remain with the apparent inadequacy of the model as presented in Appendix L of the revised RI. Toward understanding the base case simulation, the following are some items that I need to review. These do not constitute new runs; they are presentations of the data in or from the base case simulation that are not provided in the revised RI report. They are needed to understand why the model is not producing reliable results. In lieu of ENSR sending out the model input/output files to allow us to generate them in-house, and in lieu of your distributing electronic copies of them to us to work with individually, I would request that they be available for us to review at the meeting on Thursday.

At the end of this email is a suggested run for Thursday.

For the existing base case simulation:

(1) A presentation of the plot of simulated v. observed heads that shows only observation points that are not coincident with head-dependent boundary cells in the model (e.g., river cells, drain cells, etc.) Please also have the calibration statistics for this subset of observations available.

(2) Maps of the elevations of the bottoms for each of the 4 layers, drawn on a base map suitable for geographic referencing.

(3) Maps of the isopachs for each of layers 2 through 4, drawn on a base map suitable for geographic referencing.

(4) Maps of the hydraulic conductivities for each of the layers, drawn on a base map suitable for geographic referencing.

(5) A map of the cells representing river cells in a manner depicting locations of the 41 river-cell sub-groups identified in the Global file, drawn on a base map suitable for geographic referencing.

(6) A table presenting the cumulative flow for each of the 41 river-reach subsets and the 41 river flow observations.

(7) A map of the cells representing river cells in a manner depicting locations of the 59 drain-cell sub-groups identified in the Global file, drawn on a base map suitable for geographic referencing.

(8) A table presenting the cumulative flow for each of the 59 drain

subsets and the 59 drain flow observations.

(9) A contour map across the model domain that presents the difference in elevation between the USGS topographic surface and the ENSR topographic surface, drawn on a base map suitable for geographic referencing.

(10) A series of delta(head) maps from 4 to 3, 3 to 2, and 2-1, drawn on a base map suitable for geographic referencing.

(11) A contour map across the model domain that presents the differences in elevation between the USGS topographic surface and the head from Layer 1 of the model, drawn on a base map suitable for geographic referencing.

(12) A contour map across the model domain that shows the distribution of the 11 sub-groups of head values used by the GH boundary module, drawn on a base map suitable for geographic referencing. Included on this map should be an identification of those cells with two or more active GHBs.

(13) A table presenting the cumulative flows into and from the model for each of the 11 GHB sub-areas.

NEW RUN FOR THURSDAY

It would be informative to have a base case run made with the following changes, as a first cut toward a new base model:

No GHBs active.

Double the non-municipal recharge values.

Halve the "wetland" recharge values.

Triple the recharge rate over north Yard 520

Add south Yard 520 into the model with all layers reflecting CCW hydraulic conductivities and recharge equal to the 2/3 that of the new value for north Yard 520.

Track particles released from Layer 2 at regular intervals from around both north and south Yard 520.

--

Chuck

Charles H. Norris  
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(303) 322-3171

EPA-R5-2013-003300-66

**Charles Norris**  
<[cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)>  
02/03/2009 02:57 PM

To "Perry, Elizabeth"  
cc mhutson, pete\_penoyer, Bob Kay, "HERRON, KEVIN",  
"Bradley, Lisa", "Desai, Maya", Timothy Drexler,  
Brenda\_Waters  
bcc  
Subject Re: Meeting invitation: Pines Groundwater Model

Elizabeth,

In the requested run for Thursday I said, "Double the non-municipal recharge values."

This should have said, "Double the non-municipal Dune area recharge values."

--

Chuck

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(303) 322-3171

EPA-R5-2013-003300-67

"Perry, Elizabeth"  
<Elizabeth.Perry@aecom.com  
>

02/04/2009 04:03 PM

To "Charles Norris"

cc mhutson, pete\_penoyer, Bob Kay, "HERRON, KEVIN",  
"Bradley, Lisa", "Desai, Maya", Timothy Drexler,  
Brenda\_Waters

bcc

Subject RE: Materials for the PINES model meeting

Chuck, I'm confused about your first question, but hopefully the following information will answer you.

In January 2009, we emailed to Tim the global and list files for the calibrated model that was submitted with the revised RI Report in December 2008.

In June 2008, we emailed to Tim similar files associated with the model that was submitted with the RI Report in May 2008.

Elizabeth

-----Original Message-----

From: Charles Norris [mailto:cnorris@geo-hydro.com]

Sent: Tuesday, February 03, 2009 3:54 PM

To: Perry, Elizabeth

Cc: mhutson@geo-hydro.com; pete\_penoyer@nps.gov;  
kay.bob@epamail.epa.gov; HERRON, KEVIN; Bradley, Lisa; Desai, Maya;  
Drexler.Timothy@epamail.epa.gov; Brenda\_Waters@nps.gov  
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At the end of this email is a suggested run for Thursday.

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(1) A presentation of the plot of simulated v. observed heads that shows

only observation points that are not coincident with head-dependent boundary cells in the model (e.g., river cells, drain cells, etc.)

Please also have the calibration statistics for this subset of observations available.

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(6) A table presenting the cumulative flow for each of the 41 river-reach subsets and the 41 river flow observations.

(7) A map of the cells representing river cells in a manner depicting locations of the 59 drain-cell sub-groups identified in the Global file, drawn on a base map suitable for geographic referencing.

(8) A table presenting the cumulative flow for each of the 59 drain subsets and the 59 drain flow observations.

(9) A contour map across the model domain that presents the difference in elevation between the USGS topographic surface and the ENSR topographic surface, drawn on a base map suitable for geographic referencing.

(10) A series of delta(head) maps from 4 to 3, 3 to 2, and 2-1, drawn on a base map suitable for geographic referencing.

(11) A contour map across the model domain that presents the differences in elevation between the USGS topographic surface and the head from Layer 1 of the model, drawn on a base map suitable for geographic referencing.

(12) A contour map across the model domain that shows the distribution of the 11 sub-groups of head values used by the GH boundary module, drawn on a base map suitable for geographic referencing. Included on this map should be an identification of those cells with two or more active GHBs.

(13) A table presenting the cumulative flows into and from the model for each of the 11 GHB sub-areas.

NEW RUN FOR THURSDAY

It would be informative to have a base case run made with the following changes, as a first cut toward a new base model:

No GHBs active.

Double the non-municipal recharge values.

Halve the "wetland" recharge values.  
Triple the recharge rate over north Yard 520  
Add south Yard 520 into the model with all layers reflecting CCW  
hydraulic conductivities and recharge equal to the 2/3 that of the new  
value for north Yard 520.  
Track particles released from Layer 2 at regular intervals from around  
both north and south Yard 520.

--  
Chuck

Charles H. Norris  
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(303) 322-3171

EPA-R5-2013-003300-68

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
02/04/2009 04:38 PM

To "Perry, Elizabeth"  
cc mhutson, pete\_penoyer, Bob Kay, "HERRON, KEVIN",  
"Bradley, Lisa", "Desai, Maya", Timothy Drexler,  
Brenda\_Waters  
bcc  
Subject Re: Materials for the PINES model meeting

Elizabeth,

Sorry to confuse you. I'll try again.

The "LST" file you sent Tim and he forwarded us in January contains the comment lines at (near) the top

#GMS MODFLOW Simulation  
#17 October 2007

File names in the "GLO" file imply the model was run 30 October 08, with a newer version of the MODFLOW program than had used for the run last spring.

What I want to know is, does the model that was input to MODFLOW for the 30-Oct-08 simulation, for purposes of the revised RI, date back to 17-OCT-07, as indicated in the "LST" file header?

--

Chuck

Charles H. Norris  
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(303) 322-3171

EPA-R5-2013-003300-69

"Perry, Elizabeth"  
<Elizabeth.Perry@aecom.com  
>

02/04/2009 05:00 PM

To "Charles Norris"

cc mhutson, pete\_penoyer, Bob Kay, "HERRON, KEVIN",  
"Bradley, Lisa", "Desai, Maya", Timothy Drexler,  
Brenda\_Waters

bcc

Subject RE: Materials for the PINES model meeting

This is a comment that's placed in the output file by GMS, the pre/post processor we're using. You'll notice the same comment in the May 2008 version of the output files. I could contact the vendor to find out the significance of this date, but I suggest we simply ignore it.

The files that we sent Tim in Dec 2008 were generated by MODFLOW from input files that were created during the process of the model revision in the fall of 2008. These represent the current calibrated model. It's possible that some input parameters did not change substantially since the model was first set up (such as the grid), but there were substantial changes in others parameters prior to the May 2008 submittal, and then between May and Dec 2008.

Let's discuss more tomorrow if we're still talking at cross-purposes!

Elizabeth

-----Original Message-----

From: Charles Norris [mailto:cnorris@geo-hydro.com]

Sent: Wednesday, February 04, 2009 5:39 PM

To: Perry, Elizabeth

Cc: mhutson@geo-hydro.com; pete\_penoyer@nps.gov;

kay.bob@epamail.epa.gov; HERRON, KEVIN; Bradley, Lisa; Desai, Maya;

Drexler.Timothy@epamail.epa.gov; Brenda\_Waters@nps.gov

Subject: Re: Materials for the PINES model meeting

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#17 October 2007

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--

Chuck

Charles H. Norris  
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(303) 322-3171

EPA-R5-2013-003300-70

"Mark Hutson "  
<mhutson@geo-hydro.com>  
02/05/2009 03:15 PM

To Timothy Drexler, pete\_penoyer, eperry, kherron, cnorris  
cc Bob Kay  
bcc

Subject RE: Pines Groundwater Model

Hi all

We need to be aware that the length of time that the CCB's have been in the landfill and the timing of any permeability tests conducted can also have a big affect on the results. I'm attaching a paper that talks about diagenesis of CCBs that have been placed in landfills.

The crux of this issue is summarized by the following quote from the paper, "The initial behaviour observed on hydration of the cementitious CCB materials discussed here is similar to that of a low-strength concrete. However, diagenesis associated with many of these CCBs reduced the strength by up to 90% and increased the permeability by two orders of magnitude after only a few years in the natural environment."

For this reason, recent tests on the materials actually disposed in the landfill would be most appropriate. Absent that possibility, permeability tests on CCBs that have been in a landfill environment for a couple of decades would be most comparable to Yard 520. Tests of newly placed CCBs are likely to underestimate the permeability that we can expect to see here.

Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Thursday, February 05, 2009 1:50 PM  
To: pete\_penoyer@nps.gov; eperry@ensr.com; kherron@idem.in.gov;  
cnorris@geo-hydro.com; mhutson@geo-hydro.com  
Cc: kay.bob@epamail.epa.gov  
Subject: Fw: Pines Groundwater Model

----- Forwarded by Timothy Drexler/R5/USEPA/US on 02/05/2009 02:50 PM  
-----

Robert T Kay  
<rtkay@usgs.gov>

02/05/2009 02:10  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject

Pines Groundwater Model

did a net search on hydraulic conductivity of fly ash, found this

1.  
<http://www.rmrc.unh.edu/tools/uguidelines/cfa54.asp>

Hydraulic conductivity: The hydraulic conductivity of well-compacted fly ash ranges from  $10^{-4}$  to  $10^{-6}$  cm/s, which is roughly equivalent to the hydraulic conductivity of a silty sand to silty clay soil. The hydraulic conductivity of fly ash is affected by the degree of compaction, grain size distribution, and internal pore structure. Since fly ash consists almost entirely of spherical shaped particles, the particles are able to be densely packed during compaction, resulting in comparatively low hydraulic conductivity that minimizes the seepage of water through a fly ash embankment.

2. Fly ash sample from in new Zealand 1.6 mm/hour from Pathan and others, Journal of Environmental Quality 32:687-693 (2003)

3. fly/bottom ash mixtures from IN were in the  $10^{-7}$  to  $10^{-8}$  m/s range, which may be most on point for pines.

[http://cobweb.ecn.purdue.edu/~mprezzi/pdf/10900241\\_geotechnical\\_properties.pdf](http://cobweb.ecn.purdue.edu/~mprezzi/pdf/10900241_geotechnical_properties.pdf)

Robert T. Kay  
Hydrologist  
U.S. Geological Survey  
650B Peace Road  
DeKalb, Illinois 60115  
815-756-9207



Long Term Stability of Landfilled CCW McCarthy et al 1997.pdf

EPA-R5-2013-003300-71

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
02/05/2009 03:29 PM

To Timothy Drexler  
cc pete\_penoyer, eperry, kherron, mhutson, Bob Kay  
bcc

Subject Re: Fw: Pines Groundwater Model

Tim,  
The request has gone out for releasing the slug test - I should hear today or tomorrow.

Bob,  
Quick work! I note the Purdue study was looking at properties after achieving compaction equivalent to working the materials for geotechnical uses such as road base, etc. Hence, the values reported there are likely low relative to placement in a landfill for disposal purposes, which is unlikely to be systematically compacted to those levels. I haven't checked the others yet for details.

--

Chuck

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EPA-R5-2013-003300-72

**Pete\_Penoyer@nps.gov**

02/05/2009 05:17 PM

To Timothy Drexler

cc cnorris, eperry, Bob Kay, kherron, mhutson

bcc

Subject Re: Fw: Pines Groundwater Model

Bob,

I did a similar Google and found another reference below - that's coming up generally with the same range.

So the values for IN below equate to  $1 \times 10^{-5}$  to  $1 \times 10^{-6}$  cm/sec (or  $\times 100$  in converting m/sec to cm/sec.) with other references as high as  $1 \times 10^{-4}$  cm/sec. (silty sand to silty clay soil range - this I can believe)

The increased hydraulic conductivity values for layers 1-3 CCBs I had ENSR subst. into the model were  $K_h = 0.005$  ft. day and  $K_v = 0.001$  ft./day which is  $K_h = 1.76 \times 10^{-6}$  and  $K_v = 3.52 \times 10^{-7}$  cm/sec. or my values are still 1 to 2 orders of magnitude too low from what your 1st reference below or your IN data indicates (i.e. I was not conservative enough relative to the ENSR model derived K value for Yard 520 CCBs because I did not think they could be that far off).

It would be nice to use a conservative value at/within the upper end of your range [e.g.  $5 \times 10^{-5}$  or  $1 \times 10^{-4}$  cm/sec. which equals 1.4 to  $2.8 \times 10^{-1}$  ft./day to see what effect that has on the hydraulic gradient under the North cell. (i.e. do you still get a 5 or more foot head differential that the model produces and suggests would be the case if a well pair were to exist at PZ-001?). Note from Table 2 in the attached reference, a Class F (< 10% quicklime - bituminous eastern coal) uncompacted fly ash also can have a K value of  $5.04 \times 10^{-5}$  cm/sec. or  $1.43 \times 10^{-1}$  ft./day

Also, these are vertical hydraulic conductivities so you would expect them to represent the least value possible for a horizontal K although in this permeameter test setup  $K_v$  &  $K_h$  should be close to being equal.

<http://www.flyash.info/2005/10kal.pdf>

Thus what does a conservative model run show in terms of vertical gradients when there reasonably could be a  $K_h$  for the CCBs of  $1.43 \times 10^{-1}$  and does the fact we have a one or more foot thick organic layer (peat - as drill logs indicate) at the bottom of the CCBs act as a lower K barrier to this vertical flow so the head differential is less apparent.

So the  $K_h$  differential between The Yard 520 CCBs of Layers 1, 2, & 3 and those of the Sub-Yard 520 Soils (Layer 4) could be (in the real world) as little as one order of magnitude (using CCB from above/below literature values) (0.14 ft./day for CCBs vs 2 ft./day for Subsoils of ENSR's Table 4-1) while the model-derived  $K_h$  values result in a differential that is 4 orders of magnitude different (i.e. vs 0.0003 ft./day for CCBs vs 2 ft./day for Subsoils) between these layers.

Also the saturated layer with the highest  $K_h$  value in the fly ash should control the horizontal flow within the 20+ feet of CCBs unless you believe this deposit is unstratified and homogeneous.

I guess that is one way to generate a vertical gradient when you have no hard data to support it.

I don't think I have ever observed a downward head differential of this magnitude and a downward head differential is usually indicative of a very strong recharge area which we are not supposed to have here due to the low permeability cap. An upward head differential of this magnitude due to a confined aquifer below a water table aquifer is not that uncommon however. This just isn't credible without hard data to support it - these values the model produces are a little extreme and too much of a reach.

The factor I am using for converting ft./day to cm/sec. is 0.000352 if that helps.

Pete

Peter E. Penoyer  
Hydrologist, WRD  
1201 Oakridge Dr., Ste. 250  
Ft. Collins, CO 80525  
Ph 970-225-3535  
Fax 970-225-9965  
email: pete\_penoyer@nps.gov

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|-----+----->
|           |           Drexler.Timothy@epam| |
|           |           ail.epa.gov         |
|           |           |                   |
|           |           02/05/2009 02:50 PM |
|           |           CST                 |
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|
|           To:           pete_penoyer@nps.gov, eperry@ensr.com,
kherron@idem.in.gov, cnorris@geo-hydro.com, mhutson@geo-hydro.com |
|           cc:           kay.bob@epamail.epa.gov
|
|           Subject:      Fw: Pines Groundwater Model
|
>-----
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----- Forwarded by Timothy Drexler/R5/USEPA/US on 02/05/2009 02:50 PM  
-----

Robert T Kay

<rtkay@usgs.gov>

02/05/2009 02:10  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
CC

Subject  
Pines Groundwater Model

did a net search on hydraulic conductivity of fly ash, found this

1.  
<http://www.rmrc.unh.edu/tools/uguidelines/cfa54.asp>

Hydraulic conductivity: The hydraulic conductivity of well-compacted fly ash ranges from  $10^{-4}$  to  $10^{-6}$  cm/s, which is roughly equivalent to the hydraulic conductivity of a silty sand to silty clay soil. The hydraulic conductivity of fly ash is affected by the degree of compaction, grain size distribution, and internal pore structure. Since fly ash consists almost entirely of spherical shaped particles, the particles are able to be densely packed during compaction, resulting in comparatively low hydraulic conductivity that minimizes the seepage of water through a fly ash embankment.

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Robert T. Kay

Hydrologist  
U.S. Geological Survey  
650B Peace Road  
DeKalb, Illinois 60115  
815-756-9207

EPA-R5-2013-003300-73

**Pete\_Penoyer@nps.gov**

02/05/2009 06:43 PM

To "Mark Hutson"

cc cnorris, Timothy Drexler, eperry, Bob Kay, kherron

bcc

Subject RE: Pines Groundwater Model

Another paragraph from Bob Kay's reference (below) only this is on "Site Drainage" and possibly why we have a water table mound under the North Landfill that would be expected to conform to the topography of the North Cell instead of a mound centered under the ditch that separates the two landfill cells. The North cell was located in a wetland, is composed of a grain size material that easily wicks water upward, is much larger than your standard embankment (approaching the size of a dune ridge) and did not include placement of a well-draining granular material at its base.

Site Drainage

Fly ash, because of its predominance of silt-size particles, tends to wick water, making it possible that the lower extremities of a fly ash embankment could become saturated. The base of a fly ash embankment should not be exposed to free moisture, wetlands, or the presence of a high water table condition. An effective way to prevent capillary rise or the effects of seepage in fly ash embankments and backfills is the placement of a drainage layer of well-draining granular material at the base of the embankment.(12

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1201 Oakridge Dr., Ste. 250  
Ft. Collins, CO 80525  
Ph 970-225-3535  
Fax 970-225-9965  
email: pete\_penoyer@nps.gov

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|-----+----->
|           |           "Mark Hutson" | |
|           |           <mhutson@geo-hydr|
|           |           o.com>         |
|           |           |               |
|           |           02/05/2009 02:15 |
|           |           PM MST           |
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|
|           To:           <Drexler.Timothy@epamail.epa.gov>, <pete_penoyer@nps.gov>,
<eperry@ensr.com>, <kherron@idem.in.gov>, |
|           <cnorris@geo-hydro.com>
```

|  
| cc: <kay.bob@epamail.epa.gov>  
|  
| Subject: RE: Pines Groundwater Model  
|

>-----  
----- |

Hi all

We need to be aware that the length of time that the CCB's have been in the landfill and the timing of any permeability tests conducted can also have a big affect on the results. I'm attaching a paper that talks about diagenesis of CCBs that have been placed in landfills.

The crux of this issue is summarized by the following quote from the paper, "The initial behaviour observed on hydration of the cementitious CCB materials discussed here is similar to that of a low-strength concrete. However, diagenesis associated with many of these CCBs reduced the strength by up to 90% and increased the permeability by two orders of magnitude after only a few years in the natural environment."

For this reason, recent tests on the materials actually disposed in the landfill would be most appropriate. Absent that possibility, permeability tests on CCBs that have been in a landfill environment for a couple of decades would be most comparable to Yard 520. Tests of newly placed CCBs are likely to underestimate the permeability that we can expect to see here.

Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Thursday, February 05, 2009 1:50 PM  
To: pete\_penoyer@nps.gov; eperry@ensr.com; kherron@idem.in.gov;  
cnorris@geo-hydro.com; mhutson@geo-hydro.com  
Cc: kay.bob@epamail.epa.gov  
Subject: Fw: Pines Groundwater Model

----- Forwarded by Timothy Drexler/R5/USEPA/US on 02/05/2009 02:50 PM  
-----

Robert T Kay  
<rtkay@usgs.gov>

02/05/2009 02:10  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject

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df

Robert T. Kay  
Hydrologist  
U.S. Geological Survey  
650B Peace Road  
DeKalb, Illinois 60115  
815-756-9207

(See attached file: Long Term Stability of Landfilled CCW McCarthy et al  
1997.pdf)  Long Term Stability of Landfilled CCW McCarthy et al 1997.pdf

EPA-R5-2013-003300-74

Charles Norris  
<cnorris@geo-hydro.com>  
02/06/2009 01:01 PM

To "Perry, Elizabeth"  
cc Timothy Drexler, Bob Kay, mhutson, "HERRON, KEVIN",  
pete\_penoyer, "Bradley, Lisa", "Desai, Maya"  
bcc  
Subject Re: Sensivity, hds in NW

Good morning, All,

I would like, again, to thank Elizabeth and ENSR for yesterday's meeting. It was my first time for such meeting and I found it very useful and helpful.

The simulation that was sent this morning, using fixed head cells to erase the highest of the standing-water mounds, identifies a potential problem with the way the model conceptualizes ponds, i.e., using the river module as a boundary condition at ponds. The image sent this morning shows that the two ponds nearest MW-119 are actively recharging enough water into the model and therefore supporting high heads in that area. (You may recall that MW-119 was a point where the model simulated higher heads than observed in MW-119.)

IF these closed ponds (and other ponds in the model domain) are flux boundaries, it would be only to the extent that precipitation exceeds pan evaporation or pan evaporation exceeds precipitation. If those are reasonably balanced, the ponds are just very large diameter piezometers that passively report the position of the water table. In any event, the flux relationship is not head-dependent, as implied in the choice of simulating them with the river module, and any error in the assigned water elevations of a head-dependent boundary will generate a false sink or source of water in the simulation.

In hindsight, shooting elevations of the ponds and tracking changes in their elevations over the course of the RI would have been a good idea.

That deficiency can't be undone. However, there is still the opportunity to shoot synchronous water elevations of ponds and of monitoring wells in the vicinity of each. Pond observations at the time of such shooting may also provide measurement of how much higher a pond can fluctuate. Doing so will provide at least a snap-shot of the appropriate relative elevation differences at the time of observation, and provide some constraint on what is an acceptable apparent gradient from a simulation.

Yesterday, there was discussion regarding further testing at north Yard 520 to establish permeabilities and/or head gradients there. GHI recommends that testing be done in north Yard 520. We also recommend that water elevations be obtained for ponds that are being simulated as head-dependent boundaries, with synchronous heads measured at monitoring wells in the vicinity of those ponds.

Also yesterday, Tim forwarded a document IDEM provided him regarding the filling/closure of the storm water retention area east of the ash placement area in south Yard 520. On one of the images yesterday it was depicted as the eastern 1/3 of the south Yard 520 "dead zone" in the model. We are reviewing the significance of that document and may provide further comment or recommendations shortly.

--

Chuck

Charles H. Norris  
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Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-75

**Timothy  
Drexler/R5/USEPA/US**  
02/10/2009 02:01 PM

To eperry  
cc lbradley  
bcc

Subject Fw: Pines Groundwater Model

FYI. More discussion.

----- Forwarded by Timothy Drexler/R5/USEPA/US on 02/10/2009 02:01 PM -----

**Pete\_Penoyer@nps.gov**  
02/09/2009 05:13 PM

To Bob Kay/R5/USEPA/US@EPA  
cc cnorris@geo-hydro.com, Timothy  
Drexler/R5/USEPA/US@EPA, kherron@idem.in.gov,  
mhutson@geo-hydro.com, pete\_penoyer@nps.gov

Subject Re: Fw: Pines Groundwater Model

Bob, From your reference on the Wabash River Plant fly ash  
[http://cobweb.ecn.purdue.edu/~mprezzi/pdf/10900241\\_geotechnical\\_properties.pdf](http://cobweb.ecn.purdue.edu/~mprezzi/pdf/10900241_geotechnical_properties.pdf)

Note: for the F100 and F75 B25 fly ash cases the content is < 8% clay and from SEMs below - the material is pretty well-rounded silt. The silt I have looked at in thin-section from loess deposits in Nebraska tends to be more like clay particles (i.e. tabular) which when settling out of a fluid (air or water) tend to lie flat and make for relatively lousy permeability. That is why fly ash (rounded and predominately silt size) will reach K values of that of the mid range of a silty sand [i.e.  $1 \times 10^{-4}$  cm/sec.] and not likely reach as low as that of an unweathered marine shale [i.e.  $1 \times 10^{-7}$  cm/sec] [per Freeze and Cherry (1979) Table 2.2, p. 29] or that the ENSR model determined  $3 \times 10^{-4}$  ft./day or  $1 \times 10^{-7}$  cm/sec range.

By having the model calibrate to a low hydraulic conductivity for the CCBs, and using that to contrast with Yard 520 subsoil aquifer K values to support the hypothesis of a "strong downward vertical gradient" as ENSR does rather than applying a more conventional horizontal gradient to a water table mound, the COCs reach the surficial aquifer directly below and are acted upon immediately by the hydraulic regime ENSR develops for Layer 4, way before reaching the property boundary. This influence of layer 4 hydraulics rather than a more horizontal hydraulic gradients in the CCBs helps to start turning any plume to the NE before it even reaches the property boundary (remember the particle tracking).

In eastern Nebraska while working for COE, I oversaw the delineation of several groundwater plumes in loess ~50 or more feet thick with an underlying high conductivity alluvial sand and gravel aquifer (similar to stratigraphic situation of Yard 520). The area also had some topographic relief (100 feet or so). The loess had equal/lower hydraulic conductivity

than this fly ash we are dealing with here and the underlying alluvial sand & gravel aquifer had higher hydraulic conductivity than the surficial aquifer we have here (thus a greater K value contrast than we have here to drive the head differential under the north cell). Nowhere did I see more than a few inches of head differential between paired monitoring wells in the loess and the higher K aquifer immediately below. Wells separated spatially and by topographic relief were readily explained by a conventional slope of the water table/phreatic surface that followed or conformed to the topography.

So folks, you will have to excuse me if I remain skeptical of the ENSR interpretation, particularly with what Chuck pointed out to us that may be the driver of the hydraulics of Layer 4 so clearly in the Webex demonstration. Can anyone explain why this pile of water in the Great Marsh (a potential 800 lb gorilla in the model) did not appear in the water table figures we received in conjunction with the RI report?

It does not make sense when we see a water table mound under the North landfill with 6 or more feet of elevation head above the surrounding area and a nearly flat water table to the immediate NW, to have the groundwater flow paths turn so dramatically to the NE without some manipulation of the model. For example, the water table surface defined in this NW area immediately adjacent to Yard 520 based on average heads at MW124 (615.70 feet), MW1 (616.20 feet), TW14S (616.15 feet), and MW102 (614.96 feet) define a water table slope that is North to NNW yet the groundwater flow paths curve dramatically NE in this area (from Fig. 4-4 & Table 4-2). Note the two wells (MW124 and MW102) to the West and North respectively of the four, have the lowest average heads yet groundwater flow (paths) are turning NE. This is a simple exercise to demonstrate the model is obviously fundamentally flawed and should have been discovered by ENSR 6 mos. ago. Why have we gotten this far without ENSR checking their own results?

Thanks all,  
Pete

(Embedded image moved to file: pic06944.jpg)

(Embedded image moved to file: pic27536.jpg)

Peter E. Penoyer  
Hydrologist, WRD  
1201 Oakridge Dr., Ste. 250  
Ft. Collins, CO 80525  
Ph 970-225-3535  
Fax 970-225-9965  
email: [pete\\_penoyer@nps.gov](mailto:pete_penoyer@nps.gov)

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|           |           Pete Penoyer           | | |
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|           |           02/05/2009 04:17        |
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|           To:           Drexler.Timothy@epamail.epa.gov  
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|           cc:           cnorris@geo-hydro.com, eperry@ensr.com,  
kay.bob@epamail.epa.gov, kherron@idem.in.gov,                               |  
|           mhutson@geo-hydro.com  
|  
|           Subject: Re: Fw: Pines Groundwater Model (Document link: Pete  
Penoyer)   |

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Bob,

I did a similar Google and found another reference below - that's coming up generally with the same range.

So the values for IN below equate to  $1 \times 10^{-5}$  to  $1 \times 10^{-6}$  cm/sec (or  $\times 100$  in converting m/sec to cm/sec.) with other references as high as  $1 \times 10^{-4}$  cm/sec. (silty sand to silty clay soil range - this I can believe)

The increased hydraulic conductivity values for layers 1-3 CCBs I had ENSR subst. into the model were  $K_h = 0.005$  ft./day and  $K_v = 0.001$  ft./day which is  $K_h = 1.76 \times 10^{-6}$  and  $K_v = 3.52 \times 10^{-7}$  cm/sec. or my values are still 1 to 2 orders of magnitude too low from what your 1st reference below or your IN data indicates (i.e. I was not conservative enough relative to the ENSR model derived K value for Yard 520 CCBs because I did not think they could be that far off).

It would be nice to use a conservative value at/within the upper end of your range [e.g.  $5 \times 10^{-5}$  or  $1 \times 10^{-4}$  cm/sec. which equals 1.4 to  $2.8 \times 10^{-1}$  ft./day to see what effect that has on the hydraulic gradient under the North cell. (i.e. do you still get a 5 or more foot head differential that the model produces and suggests would be the case if a well pair were to exist at PZ-001?). Note from Table 2 in the attached reference, a Class F (< 10% quicklime - bituminous eastern coal) uncompacted fly ash also can have a K value of  $5.04 \times 10^{-5}$  cm/sec. or  $1.43 \times 10^{-1}$  ft./day

Also, these are vertical hydraulic conductivities so you would expect them to represent the least value possible for a horizontal K although in this permeameter test setup  $K_v$  &  $K_h$  should be close to being equal.

<http://www.flyash.info/2005/10kal.pdf>

Thus what does a conservative model run show in terms of vertical gradients when there reasonably could be a  $K_h$  for the CCBs of  $1.43 \times 10^{-1}$  and does the fact we have a one or more foot thick organic layer (peat - as drill logs indicate) at the bottom of the CCBs act as a lower K barrier to this vertical flow so the head differential is less apparent.

So the  $K_h$  differential between The Yard 520 CCBs of Layers 1, 2, & 3 and those of the Sub-Yard 520 Soils (Layer 4) could be (in the real world) as little as one order of magnitude (using CCB from above/below literature values) ( $0.14$  ft./day for CCBs vs  $2$  ft./day for Subsoils of ENSR's Table 4-1) while the model-derived  $K_h$  values result in a differential that is 4 orders of magnitude different (i.e. vs  $0.0003$  ft./day for CCBs vs  $2$  ft./day

for Subsoils) between these layers.

Also the saturated layer with the highest Kh value in the fly ash should control the horizontal flow within the 20+ feet of CCBs unless you believe this deposit is unstratified and homogeneous.

I guess that is one way to generate a vertical gradient when you have no hard data to support it.

I don't think I have ever observed a downward head differential of this magnitude and a downward head differential is usually indicative of a very strong recharge area which we are not supposed to have here due to the low permeability cap. An upward head differential of this magnitude due to a confined aquifer below a water table aquifer is not that uncommon however. This just isn't credible without hard data to support it - these values the model produces are a little extreme and too much of a reach.

The factor I am using for converting ft./day to cm/sec. is 0.000352 if that helps.

Pete

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|           |           Drexler.Timothy@epam| |
|           |           ail.epa.gov         |
|           |           |                   |
|           |           02/05/2009 02:50 PM |
|           |           CST                 |
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|           To:           pete_penoyer@nps.gov, eperry@ensr.com,
kherron@idem.in.gov, cnorris@geo-hydro.com, mhutson@geo-hydro.com |
|           cc:           kay.bob@epamail.epa.gov
|
|           Subject:      Fw: Pines Groundwater Model
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>-----
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----- Forwarded by Timothy Drexler/R5/USEPA/US on 02/05/2009 02:50 PM  
-----

Robert T Kay  
<rtkay@usgs.gov>

02/05/2009 02:10  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject  
Pines Groundwater Model

did a net search on hydraulic conductivity of fly ash, found this

1.  
<http://www.rmrc.unh.edu/tools/uguidelines/cfa54.asp>

Hydraulic conductivity: The hydraulic conductivity of well-compacted fly ash ranges from  $10^{-4}$  to  $10^{-6}$  cm/s, which is roughly equivalent to the hydraulic conductivity of a silty sand to silty clay soil. The hydraulic conductivity of fly ash is affected by the degree of compaction, grain size distribution, and internal pore structure. Since fly ash consists almost entirely of spherical shaped particles, the particles are able to be densely packed during compaction, resulting in comparatively low hydraulic conductivity that minimizes the seepage of water through a fly ash embankment.

2. Fly ash sample from in new Zealand 1.6 mm/hour from Pathan and others, Journal of Environmental Quality 32:687-693 (2003)

3. fly/bottom ash mixtures from IN were in the  $10^{-7}$  to  $10^{-8}$  m/s range, which may be most on point for pines.

[http://cobweb.ecn.purdue.edu/~mprezzi/pdf/10900241\\_geotechnical\\_properties.pdf](http://cobweb.ecn.purdue.edu/~mprezzi/pdf/10900241_geotechnical_properties.pdf)

Robert T. Kay  
Hydrologist  
U.S. Geological Survey  
650B Peace Road  
DeKalb, Illinois 60115  
815-756-9207



pic06944.jpg



pic27536.jpg

EPA-R5-2013-003300-76

Charles Norris  
<cnorris@geo-hydro.com>  
02/10/2009 11:26 PM

To "Perry, Elizabeth"  
cc Timothy Drexler, Bob Kay, mhutson, "HERRON, KEVIN",  
pete\_penoyer, "Bradley, Lisa", "Desai, Maya"  
bcc  
Subject Model re-calibration and hydraulic conductivities of CCWs

> As discussed, we'll be working on a re-calibration in this area.

Good afternoon, All,

I have a respite from alligators at the moment and wanted to provide some input on the issue of K values for landfilled fly ashes. However, first, I would like to comment, Elizabeth, on the above-cited line in your email last Friday. If ENSR's efforts are only toward the re-calibration in that area, the problems with the model are not going to go away. I hope the effort is to address the systemic problems and not just the obvious symptom to the NW.

Now, on to the K values for CCW in landfills and the implications of what is currently in the model to the results that are seen. ENSR uses  $K_h = 3e-4$  ft/day and  $K_v:K_h = 1:1$

Bob provided 3 references for coal combustion materials. I'll discuss a CCW landfill site with which I am familiar, too. Each of the three articles Bob found uses different units for conductivity. I will standardize them for everyone's convenience. (I thought about using smoots/fortnight, but settled on ft/day since that is what is in the ENSR model. I used a conversion factor of 1 cm/sec = 2835 ft/day and report values with the same precision as the authors)

Kim, Prezzi and Salgado, JGGE, July 2005. This is an evaluation of CCW being used as an engineered construction material (CCB), e.g., as road base. Permeability measurements were vertical hydraulic conductivity of ash that was mixed with water by hand and mortar mixer, molded (4" diameter) and compacted to 95% maximum density. Pete already discussed the grain size analyses. Hydraulic conductivities for two fly ashes (two different Indiana plants, neither Michigan City) are reported. I did not see whether these represent single measurements of each ash or an average of multiple measurements. The  $K_v$  of the fly ashes tested were  $9e-3$  ft/day and  $2e-2$  ft/day. Mixing (50/50) the fly ashes with bottom ashes increased the  $K_v$  for both ash systems to  $3e-2$  ft/day.

Coal Fly Ash Users Guide for Embankment or Fill, web published by Recycled Materials Resource Center of the University of New Hampshire. This article too discusses an engineered use of fly ash as a CCB, in this case use in embankment fills. No references for the reported range are cited. The statement is made that reported range is representative of "well-compacted fly ash." Elsewhere in the Guide, compaction of fly ash for this purpose is described. It indicates "well compacted" fly ash has an optimum moisture content of 20 to 35 percent, which is higher (less compacted?) than that depicted in the previous reference, although the discussion in the "Placing and Compaction" section indicates typical requirements of 90-95% standard Proctor test minimum dry density. There is no indication of whether these values represent field or laboratory data, or whether the data are  $K_v$ ,  $K_h$  or a combination. The reported range is  $3e-1$  ft/day to  $3e-3$  ft/day.

Panthan, Aylmore, and Colmer, JEQ, 2003. This article also describes coal combustion ash that is being used, rather than disposed, i.e., CCB.

The use in this instance is as a soil amendment and does not involve compaction as part of the use. These ashes were obtained from five Australian generators and the fuel was a bituminous black coal. Both fresh and weathered (3yr) fly ash was evaluated. The ashes were described primarily as "primarily fine sand- and silt-sized particles."

(This is consistent with the grain-size analyses of the Indiana ash, above.) The article goes on to describe research globally that finds fly ash is dominated by silt-sized particles. (This is inconsistent with the RI and modeling premise that fly ash is a texture similar to "talcum powder.") Kv was measured in laboratory permeameters. The reported hydraulic conductivities for these fly ashes were from  $1.01\text{e-}1$  ft/day to  $1.28\text{e-}1$  ft/day except for a coarse fly ash that was  $3.41\text{e-}1$  ft/day.

Each of these examples measures Kv. None presents data from CCW disposed in a landfill. Two of the three are of samples that have been compacted for load-bearing, construction purposes. Yet, even the compacted ashes have Kv values substantially above both Kv and Kh of the landfilled ash as simulated in the ENSR model.

For the past three years I have been involved in the evaluation of a property that includes a closed fly ash landfill. I don't have permission, yet, to attach a card to it, but that request is in. I am approved to discuss it, however, without a card. The site is within 25 miles of Lake Michigan, on the Illinois side. The ash was initially from Illinois Basin coals but later from Wyoming coals. Disposal started in the 1970s and continued through the 1980s, perhaps into the early 1990s. Ash was trucked to the disposal facility and dumped. It was spread by dozer and tracked over sufficiently to bear the load of more trucks; there was no systematic compaction of the fly ash. When the area was full, the top was graded to prevent free-standing water but not so steep as to encourage erosion. A clay soil cap 18" thick was added and seeded to encourage evapotranspiration and prevent erosion. As best I can tell, the location, vintage, contents, disposal methods, and closure are very analogous to north Yard 520.

This landfill lies within the boundaries of a moderately large MODFLOW groundwater model. The landfill is large enough that it needed to be individually characterized in the model.

The landfill was cored in several places and the cores were described in detail. Pore-water chemistry, soil chemistry, and TCLP leaching tests were performed at multiple levels in each location. Head levels were mapped to determine the apex of the water table and a permanent piezometer was installed there. The location corresponds closely to the topographic high of the landfill. Slug tests were performed in the permanent piezometer. The rate of net recharge was estimated using the model HELP (USACE/EPA) at about a dozen sub-areas based upon location specific soil thicknesses and ground slopes.

The HELP simulation results were used to estimate recharge to the model in the area of the landfill. The slug test measurement of Kh was used directly. Based upon visual layering in the cores, the model initially assume Kh:Kv was 1:0.1. Calibration of the model did better with Kh:Kv of 1:0.01. The model uses a variety of boundary conditions across the domain river cells, drain cells, general head boundaries and constant head cells. The modeled Kh is 3.7 ft/day, the Kv is 0.037 ft/day, and the recharge is 9 inches per year.

Re-Parameterization of north Yard 520.

An ash landfill that appears very analogous to north Yard 520 was methodically characterized compositionally and hydrologically. Using that characterization, a reasonably similar groundwater model was constructed that was able with minimum difficulty to duplicate the landfill's contribution to the surrounding hydrogeology, including geochemistry. Based upon that success, it would appear actual characterization of the waste and hydrogeology within north Yard 520 would be very useful.

Absent actual characterization, serious numerical experimentation should be tried. Using the characterized landfill as an analog, one might start with much higher Kh values, substantially higher recharge, and a significant horizontal:vertical anisotropy. Additional calibration criteria that should be included in the assessment might include duplicating the seeps from the north Yard 520 landfill cap on the west flank above Birch Street and the existence and distribution of boron contamination in the neighborhood north and east of the landfill in Layer 2 of the model, as evidenced in the chemistry of the domestic wells there.

--

Chuck

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EPA-R5-2013-003300-77

**Timothy  
Drexler/R5/USEPA/US**  
02/23/2009 01:18 PM

To eperry  
cc lbradley, kay.bob, pete\_penoyer, cnorris, mhutson,  
vblumenfeld, dsullivan  
bcc  
Subject Pines Site groundwater model way forward

Hi Elizabeth:

Following up on our phone conversation today, attached is what we discussed in order to get the groundwater modeling completed.

1. Redo boundary conditions to correct the mounding problems in the n-nw area. This includes the mound that is apparent in the Great Marsh area and in some monitoring wells. Please supply us with those planned changes by Feb. 27th for our review.
2. Please provide us with the information and displays that were promised during the webex presentation unless they would take a lot of time to reproduce. If that is the case, please contact me so that we can discuss what you can reasonably provide.
3. Please make sure that the pond cells that are currently used as river cells in the modelling program do not cause any unreasonable results, for example causing 10-14 ft./yr of evaporation or adding undue amounts of water to the system as it appears in the current model.
4. Do not incorporate PZ001 and P2 as a well pair in the mathematical modeling. They should not be used as if they were side by side.
5. Please model the CCB in the north cell utilizing the range of hydraulic conductivities that have been shared by everyone from the other CCB studies.
6. Once complete, please provide the electronic groundwater model files to us in a format that can be input into the program.

Once we have approved the proposed boundary conditions, I will expect the model in 5 business days. Please contact me if you have any questions on this. Thanks again from everyone for the webex presentation. It was very well done.

-Tim

Tim Drexler  
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fax: 312.886.4071

EPA-R5-2013-003300-78

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
02/23/2009 01:48 PM

To Timothy Drexler  
cc Mark Hutson  
bcc  
Subject One more thing, ...

Tim,

Of course I thought of something else after we spoke. However, it is applicable after what ENSR is currently doing to refine the model, so it can be brought up later.

When ENSR gets around to applying an improved model, they should be asked to refine the placement of the particles that they release. At present, they are releasing the particles at the centers of cells. Because of the geometry of the grid system, this places the particles very close to the aquifer under the waste in the north Yard 520 landfill but never closer than 40 feet to the aquifer at the sides of the waste.

The resulting pictures describes only the paths of particles that move into and through Layer 4 of the model.

In addition to tracking those particles, ENSR should also position particles on the perimeter of the model cells containing waste, so that one can see the paths of particles leaving the flanks of the landfill, not just out the bottom of the landfill. This may partially account for the discrepancy between water quality measured in residential wells and the lack of particle tracks moving through the neighborhood.

(I am presupposing here that the front-end ENSR is using for MODFLOW and MODPATH allows them to place the particle origin anywhere and not just at cell centers. It's not the front-end I use, but given the flexibility we saw in the web conference, I don't think that would be a problem.)

Thanks again for the call this morning.

--

Chuck

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EPA-R5-2013-003300-79

**Pete\_Penoyer@nps.gov**

02/23/2009 03:40 PM

To Timothy Drexler

cc Bob Kay, pete\_penoyer, cnorris, mhutson, "HERRON, KEVIN"

bcc

Subject Re: Pines Site groundwater model way forward

Tim, Based on our call last week, I would recommend clarification of the following:

RE#4 To clarify w/ENSR should that be necessary.

4. Do not incorporate PZ001 and P2 as a well pair in the mathematical modeling. They should not be used as if they were side by side. The head differential between this piezometer and well cannot be used in the model to represent a vertical gradient at Yard 520 between the fly ash (Model Layers 1,2 & 3) and the subsoil aquifer (layer 4) due to their spatial and vertical (topographic) separation. There is no way to determine if all or a significant portion of this head differential is not due to a conventional gradient of the phreatic surface.

The vertical gradient within the shallow flow system at this site is not likely to be significant and can only be documented with a well pair.

The model will still be incorrect by not contouring the water table base case for calibration to conform to the topography of the north cell while still honoring the well control. This could be done to contrast what ENSR has done which poorly honors their measured water table data and they have yet to do beyond the webex demo case that placed a second well on the topo high ~600 feet west of PZ-001 and caused a radial flow pattern to develop away from the E-W oriented water table mound/topographic high of the North Cell. However, with the model electronic files, Chuck Norris and Mark Hutson may be able to correct that provision of the base calibration contour map should that be deemed important. With the other changes that are more critical at this point, that change may or may not have a significant effect on the flow paths so did not bring up in your call to me last week.

ENSR's failure to follow a more conventional water table contouring approach in this instance, suggests to me that their client may have other landfills in the state of Indiana that lack a monitoring well on the landfill crest. They may have been so enthusiastic to remove this piezometer (PZ-001) as it demonstrates mounding and flow reversal (or a radial flow pattern). If this RI is somewhat precedent setting, it could be problematic for owner/operators and nearby landowners to other landfills that were once up gradient but now (unsuspectingly) would find themselves as a result of a similar groundwater flow reversal caused by mounding (were monitoring data available), down gradient from such facilities.

Thank you,  
Pete

Peter E. Penoyer  
Hydrologist, WRD

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email: pete\_penoyer@nps.gov

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|           To:           eperry@ensr.com
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|           cc:           lbradley@ensr.com, kay.bob@epamail.epa.gov,
pete_penoyer@nps.gov, cnorris@geo-hydro.com,
|           mhutson@geo-hydro.com, vblumenfeld@bibtc.com,
dsullivan@nisource.com
|           Subject:      Pines Site groundwater model way forward
|
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-Tim

Tim Drexler  
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EPA-R5-2013-003300-80

Charles Norris  
<cnorris@geo-hydro.com>  
02/25/2009 06:49 PM

To Timothy Drexler  
cc Bob Kay, pete\_penoyer, mhutson, kherron  
bcc  
Subject Re: Fw: pines modeling

Tim,  
I'm a little unclear about the breadth of Elizabeth's email. If she is addressing Item 1 of the list you sent Monday, that is one thing. If that is the totality of what they expect to do to address the entire list, that's something else.

Using drain cells in the Great Marsh as a boundary condition is not an unreasonable way to simulate water loss there. So, as a general approach, obviously depending upon how it is done, I don't have a problem. That said, there are some issues that need to be kept in mind.

The heads-above-land-surface simulated in the NW corner of the model is a symptom of a poorly conceptualized and/or parameterized model - not the cause problems with the model. (An analogy is that icing your child's ear where you measured a fever doesn't address the cause of the fever or even treat the fever elsewhere.)

The NW corner was not the only place where the model computes water standing above ground surface. You may recall that the NW corner was only the last area of standing water we were showing on the webex images. There were others that we didn't visually tour once that area was seen. ENSR needs to include in their calibration process a consideration of all hydrogeologic conditions that are known in the model domain, not just the head data at measuring points. Predictions of flowing artesian aquifers where none are observed to exist (also discussed during the webex) and standing water where none exists are two such examples of non-quantitative calibration that are as necessary as qualitative calibration at monitoring wells. (There are an infinite number of ways that heads at discreet monitoring points can be matched by computer simulation. That match is necessary, but not sufficient. The simulation that produces that statistical match must also be physically possible.)

When the Great Marsh drains are added to the model, they should included in such a way that the modelers can evaluate both the total water being taken by the model by those drains and the distribution of the extractions. Another non-quantitative calibration that needs be performed is to verify that the water being taken from the model is physically reasonable for a discharge to the Great Marsh in the area (s) the extraction is being simulated. For example, if extraction rates represent model discharge of a stream the size of Brown Ditch in an area where there is no drainage of that capacity, then there is something seriously wrong, even if the simulated heads at monitoring points are acceptably close to observations.

--  
Chuck

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EPA-R5-2013-003300-81

**Timothy  
Drexler/R5/USEPA/US**  
02/26/2009 08:58 AM

To eperry  
cc  
bcc  
Subject Fw: pines modeling

Elizabeth:

Do we need to discuss this?

----- Forwarded by Timothy Drexler/R5/USEPA/US on 02/26/2009 08:58 AM -----

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
02/25/2009 06:49 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc Bob Kay/R5/USEPA/US@EPA, pete\_penoyer@nps.gov,  
mhutson@geo-hydro.com, kherron@idem.in.gov

Subject Re: Fw: pines modeling

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--

Chuck

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EPA-R5-2013-003300-82

**Timothy  
Drexler/R5/USEPA/US**  
03/04/2009 03:30 PM

To "Perry, Elizabeth"  
cc "Bradley, Lisa", kherron, pete\_penoyer, cnorris, mhutson,  
kay.bob  
bcc  
Subject Re: pines modeling

Hi Elizabeth:

Please recalibrate the Pines groundwater model, as you recommend, considering all hydrogeologic conditions that are known in the model domain, including your proposal for the Great Marsh area. Utilize the information you are receiving from the NPS regarding park water levels. Please call me on March 11th to let me know that you have completed the model and to tell me of any difficulties you may have encountered. I will then expect another webex presentation on Tuesday March 17th to EPA, our support agency partners, and the technical advisors to the P.I.N.E.S. group, if that day works for everyone. On the day of the webex I will also expect that the electronic files of the revised model will be distributed to me and to everyone on this e-mailing list. I understand that to reproduce the previous results would take time and effort from this work. For that reason, I will not expect any additional information on the previous model.

Please call me if you have any questions.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
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Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

"Perry, Elizabeth" <Elizabeth.Perry@aecom.com>

**"Perry, Elizabeth"**  
**<Elizabeth.Perry@aecom.co**  
**m>**  
02/25/2009 04:52 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc "Bradley, Lisa" <Lisa.Bradley@aecom.com>

Subject pines modeling

Tim, as we discussed the other day, here is our recommendation:

To address the high predicted water levels in the northwest corner of the model domain, we propose to simulate the Great Marsh wetlands as a boundary condition. Information from the flown topographic map (Appendix Z of the RI Report) and the NWI mapping program will be used to identify areas of the Great Marsh that are seasonally flooded. These areas will be assigned a drain boundary condition with an elevation at approximately the level of the ground surface (as shown on the topographic base map, USGS Topo Map and/or DEM database). This approach will simulate groundwater elevations and gradients consistent with the observed standing water present in this area for much of the year. The conductance of

the drain will be established through a calibration process. This treatment of the wetland areas may also require other changes to the model to maintain an adequate calibration.

Feel free to contact us if you have any questions or comments.

Elizabeth

**A. Elizabeth Perry, PG**  
Senior Hydrogeologist  
AECOM Environment  
tel: 978-589-3167

**AECOM**  
2 Technology Park Drive  
Westford, MA 01886  
tel: 978-589-3000  
fax: 978-589-3100  
[www.aecom.com](http://www.aecom.com)

EPA-R5-2013-003300-83

"Mark Hutson"  
<mhutson@geo-hydro.com>  
03/12/2009 04:49 PM

To Timothy Drexler  
cc  
bcc  
Subject RE: pines modeling

Tim

Has the time of the Webex been finalized?

Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Wednesday, March 04, 2009 2:30 PM  
To: Perry, Elizabeth  
Cc: Bradley, Lisa; kherron@idem.in.gov; pete\_penoyer@nps.gov;  
cnorris@geo-hydro.com; mhutson@geo-hydro.com; kay.bob@epamail.epa.gov  
Subject: Re: pines modeling

Hi Elizabeth:

Please recalibrate the Pines groundwater model, as you recommend, considering all hydrogeologic conditions that are known in the model domain, including your proposal for the Great Marsh area. Utilize the information you are receiving from the NPS regarding park water levels. Please call me on March 11th to let me know that you have completed the model and to tell me of any difficulties you may have encountered. I will then expect another webex presentation on Tuesday March 17th to EPA, our support agency partners, and the technical advisors to the P.I.N.E.S. group, if that day works for everyone. On the day of the webex I will also expect that the electronic files of the revised model will be distributed to me and to everyone on this e-mailing list. I understand that to reproduce the previous results would take time and effort from this work. For that reason, I will not expect any additional information on the previous model.

Please call me if you have any questions.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

"Perry,  
Elizabeth"  
<Elizabeth.Perry

@aecom.com>

02/25/2009 04:52  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc  
"Bradley, Lisa"  
<Lisa.Bradley@aecom.com>

Subject  
pines modeling

Tim, as we discussed the other day, here is our recommendation:

To address the high predicted water levels in the northwest corner of the model domain, we propose to simulate the Great Marsh wetlands as a boundary condition. Information from the flown topographic map (Appendix Z of the RI Report) and the NWI mapping program will be used to identify areas of the Great Marsh that are seasonally flooded. These areas will be assigned a drain boundary condition with an elevation at approximately the level of the ground surface (as shown on the topographic base map, USGS Topo Map and/or DEM database). This approach will simulate groundwater elevations and gradients consistent with the observed standing water present in this area for much of the year. The conductance of the drain will be established through a calibration process. This treatment of the wetland areas may also require other changes to the model to maintain an adequate calibration.

Feel free to contact us if you have any questions or comments.

Elizabeth

A. Elizabeth Perry, PG  
Senior Hydrogeologist  
AECOM Environment  
tel: 978-589-3167

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2 Technology Park Drive  
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fax: 978-589-3100  
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EPA-R5-2013-003300-84

**Pete\_Penoyer@nps.gov**

03/16/2009 11:59 AM

To Timothy Drexler

cc brenda\_waters, cnorris, eperry, Bob Kay, kherron, lbradley, mhutson

bcc

Subject Re: Proposed Pines Site Webex Conf. Call 3/25/09

Tim,

Neither Paula nor I will be available March 25 and I will be out of the office the remainder of that last full week in March. However, both Paula and I would be available for the Webinar on March 30 or 31 or the first week in April. We also request to have more than 5 days to review the model files if they are only to be provided upon completion of the webinar before finalizing our comments. To provide comments in such a short time frame, particularly if the modeling report Appendix has not been rewritten will mean it will take time to go through and determine what the changes are. Sorry I can't drop everything for this project that this proposed schedule would require but I have several other projects that also have associated document reviews and schedules to meet. Although my comments on the RI document were partially completed at the time of the first webinar, they may now be substantially revised pending results of the next webinar, any changes that occur and our review of the files. Unfortunately that takes time as well and the schedule you have proposed seems unrealistic from our perspective.

If the model files are available March 25, Paula could be looking at them while I am gone so we could discuss upon my return and that would help to expedite this process for us.

regards,  
Pete

Peter E. Penoyer  
Hydrologist, WRD  
1201 Oakridge Dr., Ste. 250  
Ft. Collins, CO 80525  
Ph 970-225-3535  
Fax 970-225-9965  
email: pete\_penoyer@nps.gov

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|           |           Drexler.Timothy@epam| |
|           |           ail.epa.gov         |
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|           |           03/16/2009 09:16 AM |
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|
|           To:           kay.bob@epamail.epa.gov, pete_penoyer@nps.gov,
cnorris@geo-hydro.com, mhutson@geo-hydro.com, |
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| kherron@idem.in.gov, brenda\_waters@nps.gov  
|  
| cc: eperry@ensr.com, lbradley@ensr.com  
|  
| Subject: Proposed Pines Site Webex Conf. Call 3/25/09  
|

>-----  
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Hi All:

ENSR has requested, and EPA has granted, an extension to March 25 to have the Webex conference call to discuss their revised groundwater model for the Pines Site. I'd like to propose 10 am central time for the presentation. At that time, ENSR will provide us with all of the files for the model. I will then expect final comments from everyone on the RI Report by Monday, March 30th. Please let me know if you can make the March 25th call.

Thanks.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

EPA-R5-2013-003300-85

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
03/16/2009 02:36 PM

To Timothy Drexler  
cc Bob Kay, pete\_penoyer, mhutson, kherron, brenda\_waters,  
eperry, lbradley  
bcc  
Subject Re: Proposed Pines Site Webex Conf. Call 3/25/09

Tim,

> ENSR has requested, and EPA has granted, an extension to March 25 to  
> have the Webex conference call to discuss their revised groundwater  
> model for the Pines Site. I'd like to propose 10 am central time for the  
> presentation.

I will be able to participate in a webex conference call if it is held March 25 at 10:00am central time. I note that you refer to the conference call as a "presentation." From this, am I to understand that this conference call will be largely a display by ENSR of a new groundwater model that we will first see during the conference call, and not a working session wherein we can discuss the new model with ENSR after having previously had the opportunity to review and assess it?

> At that time, ENSR will provide us with all of the files  
> for the model.

I am unclear what is meant by, and how ENSR intends to provide us with, "all the files" at the webex meeting. Would it be possible for you to expand upon this? Is ENSR finally going to release usable input files that will allow independent execution of the model, as well as full output files of their new base case? (These are necessary for meaningful peer review and comment.) Or, does "all the files" mean image files of Figures selected by ENSR simply to illustrate points of their choice that are part of a revised modeling appendix? Or, something else?

In the past, even the limited output files ENSR has sent out have been so permission-restricted that they cannot be converted into files that can be assessed without man-weeks of hand-duplication of data entry. If EPA is interested in serious review and comment from GHI, we must be provided with the tools that allow us to understand the model thoroughly and efficiently. Neither appendix Figures nor the kinds of files ENSR has released in the past will allow that.

> I will then expect final comments from everyone on the RI  
> Report by Monday, March 30th.

It had been my understanding that the next step in this modeling review exercise was that ENSR would revise their base case model and provide it for (at least) one more round of review and comment from the participants of the previous webex conference. After that review and comment, ENSR would incorporate appropriate changes and then run any desired "what if" scenarios it chose to incorporate in a revised modeling appendix. At that point, I anticipated being able to provide integrated comments on both the modeling appendix and the draft RI report as a whole.

Rather, you indicate that we will be allowed two working days (three if

you count the due day) to analyze a major revision of the model, seemingly without even access to the model itself, apparently review a new modeling Appendix, and integrate all of that into full comments.

At best, this schedule is disappointing. I anticipate that other, stronger emotions will follow. It appears there has been a major change in the approach. It appears now that the resolution of any technical problems and flaws with the draft RI Report, and particularly the modeling, are to be deferred to later times and other venues. So be it.

We will represent our clients at those later times and in the alternative venues as diligently as we would have been willing to do so at this time and place.

If I am misreading the intent of your email and EPA is interested in meaningful participation and comment from GHI to the Draft RI Report, the schedule you have laid out is unworkable. Fifteen working days after being provided executable files for the base case of the revised groundwater model will be tight, but we would make it work. I think resolving the groundwater issues now is the better and more efficient way to proceed. I hope that can be the plan.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-86

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
03/19/2009 06:36 PM

To Timothy Drexler

cc

bcc

Subject FW: Pines groundwater modeling files

Tim

Does any of this strike you as a little overboard if the next (third iteration) of the model has nothing in it to hide?

Mark

-----Original Message-----

**From:** Perry, Elizabeth [mailto:Elizabeth.Perry@aecom.com]

**Sent:** Thursday, March 19, 2009 1:40 PM

**To:** pete\_penoyer@nps.gov; cnorris@geo-hydro.com; mhutson@geo-hydro.com

**Cc:** drexler.timothy@epamail.epa.gov; Bradley, Lisa

**Subject:** Pines groundwater modeling files

Gentlemen -

As requested and as a courtesy to facilitate your review of the draft groundwater model, we will be providing the electronic MODFLOW files for the draft groundwater model for the Pines Area of Investigation (hereinafter referred to as the "Information").

While it is not uncommon for electronic files for models to be provided to a regulatory agency as part of the RI/FS process, it is uncommon for such files to be circulated beyond persons authorized for access, used for any purpose other than comment, or provided to the public. This means this situation is unique and requires us to take certain steps to ensure that the Information is not improperly disseminated or misused.

Therefore, we request that by receipt of this Information, you agree and understand that the Information (1) is in draft form, (2) has not been approved by USEPA, and (3) is being provided for internal discussion purposes only. Furthermore, you agree not to (1) distribute the Information in any way, manner or form to a third party; (2) use the Information for any purpose other than understanding the draft groundwater model for the Pines Area of Investigation; (3) use the Information to develop opinions to be presented to a third party, including, but not limited to running scenarios and presenting those scenarios to a third party; and (4) in the case of the P.I.N.E.S Group, use the Information in a manner inconsistent with the TAP Agreement.

Upon your acknowledgement and acceptance by return e-mail of these terms and conditions of use, the Information will be sent to you.

We thank you for your understanding and appreciate your willingness not to use this Information for any purpose other than understanding the draft groundwater model for the Pines Area of Investigation. Please delete, or return without retaining any copies, the Information no later than the date set by USEPA to provide it with comments on the draft groundwater model.

Elizabeth

**A. Elizabeth Perry, PG**  
Senior Hydrogeologist  
AECOM Environment  
tel: 978-589-3167

**AECOM**  
2 Technology Park Drive  
Westford, MA 01886  
tel: 978-589-3000  
fax: 978-589-3100  
[www.aecom.com](http://www.aecom.com)

EPA-R5-2013-003300-87

"Mark Hutson"  
<mhutson@geo-hydro.com>  
03/20/2009 10:15 AM

To Timothy Drexler  
cc  
bcc

Subject RE: FW: Pines groundwater modeling files

Sorry Tim - I had your e-mail open while I was responding to a message from my daughter and thought that I was responding to her.

As far as the restrictions to get the files goes, we're going to be talking it over and will get back to you. I gives both Chuck and I heartburn on several different levels.

Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Friday, March 20, 2009 6:31 AM  
To: Mark Hutson  
Subject: Re: FW: Pines groundwater modeling files

Their issue all along with distributing the model files has been potential misuse of their model. I read through their cover letter and didn't see anything that struck me as unreasonable. Obviously we're all doing this to review the work and not to take their model, manipulate it somehow to make them look bad, and give it to the newspapers or someone else. Like I said, I didn't see anything in their letter that I had any objection to if it gets all of you the files quicker. If you read it any other way and have objections, please call me so that we can talk about it. I haven't brought our attorney into this, but if you feel its important, I can get him.

-Tim

"Mark Hutson"  
<mhutson@geo-hydro.com>

03/19/2009 06:36 PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject

FW: Pines groundwater modeling  
files

Tim

Does any of this strike you as a little overboard if the next (third iteration) of the model has nothing in it to hide?

Mark

-----Original Message-----

From: Perry, Elizabeth [mailto:Elizabeth.Perry@aecom.com]  
Sent: Thursday, March 19, 2009 1:40 PM  
To: [pete\\_penoyer@nps.gov](mailto:pete_penoyer@nps.gov); [cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com); [mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)  
Cc: [drexler.timothy@epamail.epa.gov](mailto:drexler.timothy@epamail.epa.gov); Bradley, Lisa  
Subject: Pines groundwater modeling files

Gentlemen -

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We thank you for your understanding and appreciate your willingness not to use this Information for any purpose other than understanding the draft groundwater model for the Pines Area of Investigation. Please delete, or return without retaining any copies, the Information no later than the date set by USEPA to provide it with comments on the draft groundwater model.

Elizabeth

A. Elizabeth Perry, PG  
Senior Hydrogeologist  
AECOM Environment  
tel: 978-589-3167

AECOM  
2 Technology Park Drive  
Westford, MA 01886  
tel: 978-589-3000  
fax: 978-589-3100  
[www.aecom.com](http://www.aecom.com)

EPA-R5-2013-003300-88

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
03/20/2009 07:25 PM

To Timothy Drexler  
cc Mark Hutson  
bcc

Subject AECOM terms on model distribution

Tim,

We have have significant issues with the proposed terms of distribution provided to us by AECOM. Among them are the following:

- 1) By omitting PINES from their e-mail, AECOM seems to suggest that People in Need of Environmental Security (PINES) is viewed as a problematic 'third-party' in the context of the email.
- 2) It is inappropriate for Geo-Hydro, Inc (GHI), a consultant to PINES, to enter into a contract with AECOM, a consultant for the PRPs, no matter how informal that contract.
- 3) We believe the conditions proposed by AECOM directly conflict with the responsibilities of GHI under our Agreement with PINES, the TAP agreement between the PRPs and PINES, and our individual obligations under the Indiana professional geologist licensing statues and regulations.
- 4) GHI cannot make commitments for PINES.

We have not yet forwarded AECOM's email to our clients with our views and recommendations. But, PINES would have to accept the terms, not GHI.

We believe that our involvement and review comments to date have contributed to understanding (critical) deficiencies in the RI and the model, some that may have gone unnoticed without our involvement. Our only objectives are now and always have been to thoroughly understand the RI and model and provide the best possible comments for USEPA's consideration. The proposed restrictions are neither relevant nor necessary for accomplishing those objectives.

We will be contacting Ms Perry early next week indicating our position.

In the meantime, if you contact your lawyers and wish to share their observations, we would be interested to hear them.

Have a nice weekend.

Chuck Norris and Mark Hutson

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-89

Charles Norris  
<cnorris@geo-hydro.com>  
03/23/2009 12:17 PM

To "Perry, Elizabeth"  
cc pete\_penoyer, mhutson, Timothy Drexler, "Bradley, Lisa"  
bcc  
Subject Re: Pines groundwater modeling files

Ms Perry -

GHI declines to enter the agreement between AECOM and GHI that is proposed in your email of 19-Mar-09.

We again request that AECOM provide us with electronic MODFLOW input and output files for the draft groundwater model for the Pines site (the model files) to facilitate our understanding of the model and allow the best possible discussions with AECOM and comments to USEPA.

With whatever information that is made available to us, whether the model files or something less, we will continue to participate in discussions and comments on each then-current draft version of the model. Materials with which we are working to understand the model remain in-house and we perceive our comments and observations to be appropriately restricted to the other reviewers of the model and AECOM.

At some point, the comments and discussions presumably will produce a model that USEPA accepts. At such point, the collective review comments are about the final model, not a draft, and presumably will be memorialized by USEPA as part of the RI and, hence, become public. When the RI report is final, GHI will provide its report to PINES regarding the RI report, including the model, so that PINES and, through PINES, the public can understand what is in the RI report, how it was developed, and how the RI report contributes to the total effort at the site. The opinions we formed while working with the information we are given will be part of the report to our client.

In the world where GHI practices, providing the model files to those commenting upon the model is anything but unique. When GHI does the modeling, we universally recommend to our client that the model files be offered; it's the most efficient way to understand the model in detail.

Some reviewers take advantage, some don't; but the offer is usually made. The feedback that results from transparency is always a better model, whether or not all differences of professional opinion are resolved.

If AECOM chooses not to provide GHI with the model files and does provide them to others on your email list, please let us know, so that we may keep PINES fully informed.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-90

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
03/23/2009 12:39 PM

To "Perry, Elizabeth"  
cc Timothy Drexler, Bob Kay, pete\_penoyer, mhutson,  
"HERRON, KEVIN", "Bradley, Lisa", "Desai, Maya"  
bcc  
Subject Re: Pines model information

Elizabeth,

Until the issues are solved over the distribution of the MODFLOW input and out put files, would it be possible for you to send us the LIST and GLOBAL files for the simulation that generated the data you attached to this email? You may recall that these two files were sent to us for previous draft simulations.

We do ask that this time, however, these files be sent either as TXT files or that, if sent as PDF files, the files be written with permissions set to allow the contents to be extracted more easily than by transcribing them by hand.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-91

**Brenda\_Waters@nps.gov**

03/24/2009 10:32 AM

To eperry

cc Paula\_Cuttillo, Pete\_Penoyer, Timothy Drexler

bcc

Subject Fw: pines modeling

Elizabeth,

We agree to your request below regarding the modeling data. Please forward the files to Paula Cuttillo (Paula\_Cuttillo@nps.gov) while Pete Penoyer is out of the office this week. Paula will communicate with Pete and myself.

Thank you,  
Brenda

\*\*\*\*\*

Brenda Waters  
Assistant Chief of Natural Resources  
Indiana Dunes National Lakeshore  
1100 N Mineral Springs Road  
Porter, IN 46304  
Office: (219) 395-1552  
Fax: (219) 395-1588  
\*\*\*\*\*

----- Forwarded by Brenda Waters/INDU/NPS on 03/24/2009 10:29 AM -----

Drexler.Timothy@e  
pamail.epa.gov

03/23/2009 09:26  
AM

Brenda\_Waters@nps.gov

Paula\_Cuttillo@nps.gov,  
Pete\_Penoyer@nps.gov,  
eperry@ensr.com

To

cc

Subject

Re: pines modeling

Hi Brenda and Paula:

I understand that Pete is out of the office and that Paula has an opportunity to look at the Pines Site groundwater model files from the PRP in his absence.]

Pete was sent the following message from Elizabeth Perry, the contractor for the Pines Site PRPs. The PRP would like assurance that you understand that the information you receive from them is in draft form.

If you are OK with this note, please respond to Elizabeth and she will forward the files to you. If you have any issues with the letter from Elizabeth, please contact me immediately.

Thanks for your help.

-Tim Drexler

Gentlemen -

As requested and as a courtesy to facilitate your review of the draft groundwater model, we will be providing the electronic MODFLOW files for the draft groundwater model for the Pines Area of Investigation (hereinafter referred to as the "Information").

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Elizabeth

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

Pete\_Penoyer@nps

.gov

03/05/2009 09:57  
AM

To  
Timothy Drexler/R5/USEPA/US@EPA  
CC  
Brenda\_Waters@nps.gov,  
Paula\_Cuttillo@nps.gov

Subject

Re: pines modeling

Tim,

This is our spring break week for schools here and I will be on travel the following week but I can make the Tuesday March 17th call/webex if it is not moved to later in the week or the following week.

regards,  
Pete

Peter E. Penoyer  
Hydrologist, WRD  
1201 Oakridge Dr., Ste. 250  
Ft. Collins, CO 80525  
Ph 970-225-3535  
Fax 970-225-9965  
email: pete\_penoyer@nps.gov

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|          |          Drexler.Timothy@epam| |
|          |          ail.epa.gov         |
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|          |          03/04/2009 03:30 PM |
|          |          CST                  |
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|          To:          "Perry, Elizabeth" <Elizabeth.Perry@aeacom.com>
|
|          cc:          "Bradley, Lisa" <Lisa.Bradley@aeacom.com>,
kherron@idem.in.gov, pete_penoyer@nps.gov, |
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| cnorris@geo-hydro.com, mhutson@geo-hydro.com,  
kay.bob@epamail.epa.gov |  
| Subject: Re: pines modeling  
|

>-----  
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Hi Elizabeth:

Please recalibrate the Pines groundwater model, as you recommend, considering all hydrogeologic conditions that are known in the model domain, including your proposal for the Great Marsh area. Utilize the information you are receiving from the NPS regarding park water levels. Please call me on March 11th to let me know that you have completed the model and to tell me of any difficulties you may have encountered. I will then expect another webex presentation on Tuesday March 17th to EPA, our support agency partners, and the technical advisors to the P.I.N.E.S. group, if that day works for everyone. On the day of the webex I will also expect that the electronic files of the revised model will be distributed to me and to everyone on this e-mailing list. I understand that to reproduce the previous results would take time and effort from this work. For that reason, I will not expect any additional information on the previous model.

Please call me if you have any questions.

Tim Drexler  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 W. Jackson Blvd., SR-6J  
Chicago, Illinois 60604-3590

phone: 312.353.4367  
fax: 312.886.4071

"Perry,  
Elizabeth"  
<Elizabeth.Perry  
@aecom.com>

02/25/2009 04:52  
PM

To  
Timothy Drexler/R5/USEPA/US@EPA  
cc  
"Bradley, Lisa"  
<Lisa.Bradley@aecom.com>

Subject

pin.es modeling

Tim, as we discussed the other day, here is our recommendation:

To address the high predicted water levels in the northwest corner of the model domain, we propose to simulate the Great Marsh wetlands as a boundary condition. Information from the flown topographic map (Appendix Z of the RI Report) and the NWI mapping program will be used to identify areas of the Great Marsh that are seasonally flooded. These areas will be assigned a drain boundary condition with an elevation at approximately the level of the ground surface (as shown on the topographic base map, USGS Topo Map and/or DEM database). This approach will simulate groundwater elevations and gradients consistent with the observed standing water present in this area for much of the year. The conductance of the drain will be established through a calibration process. This treatment of the wetland areas may also require other changes to the model to maintain an adequate calibration.

Feel free to contact us if you have any questions or comments.

Elizabeth

A. Elizabeth Perry, PG  
Senior Hydrogeologist  
AECOM Environment  
tel: 978-589-3167

AECOM  
2 Technology Park Drive  
Westford, MA 01886  
tel: 978-589-3000  
fax: 978-589-3100  
[www.aecom.com](http://www.aecom.com)

EPA-R5-2013-003300-92

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
03/25/2009 04:35 PM

To "Perry, Elizabeth"  
cc Timothy Drexler, Bob Kay, pete\_penoyer, mhutson,  
"HERRON, KEVIN", "Bradley, Lisa", "Desai, Maya"  
bcc  
Subject Re: Pines model information

Elizabeth,

I have been reviewing the file you sent last week, toward preparing for the planned webex on Mar 31. I wanted to be sure that I understand the changes made to the previous base case to produce this version. As I understand your email and Rev\_GWMDoe1.pdf, the following represent the entirety of the changes between them:

- a) Drain boundaries were added to (as yet unidentified) areas within the Great Marsh. Those boundaries used a common conductance value but use one of three different elevation values.
- b) The conductance of the general head boundary was everywhere changed to a new common value 1/5 of the previous value. The head values for the general head boundaries were unchanged.
- c) Some sub-wetland sand areas in each layer were reparameterized with Kh of 25 and Kv of 2.5 (ft/day), rather than the previous values of 10 and 1, respectively.
- d) Sub-Yard 520 (north portion) soils had both Kh and Kv reduced by 20%.
- e) There was a universal increase of recharge from 0.002 to 0.0027 (ft/day) for dune/upland areas.
- f) There was a universal decrease of recharge from 0.0015 to 0.0013 (ft/day) for wetland areas.
- g) There was a universal increase of recharge from 0.0025 to 0.0032 (ft/day) for municipal water service areas. (I.e., pass-through of dune/upland increase.)
- e) There was a universal increase of recharge from 0.00021 to 0.00024 (ft/day) for Yard 520 (north portion) area.
- f) There was no change in the distribution of the areas associated with each of the recharge amounts.
- g) There was no change in the definition of the municipal water service area.
- h) There are no changes to the boundary conditions of any cell that previously was assigned a river or drain boundary condition and no new river or drain boundary conditions assigned (except for the Great Marsh).
- i) There were no changes to the spatial distributions of any of the soil types in any of the layers.
- j) There were no changes in the vertical or horizontal grid discretization.

k) All other inputs to this model are identical to the model discussed at the previous webex.

Thanks in advance.

Also, there are a number of displays of data from the new draft model that I think would help with understanding of the model and the discussion at the webex next Tuesday. I will be sending a set of recommendations along shortly.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-93

Charles Norris  
<cnorris@geo-hydro.com>

03/25/2009 05:41 PM

To "Perry, Elizabeth", Timothy Drexler, Bob Kay, pete\_penoyer,  
mhutson, "HERRON, KEVIN", "Bradley, Lisa", "Desai, Maya"

cc

bcc

Subject Re: Pines model information

Elizabeth,

Below are a list of maps and data displays that would be helpful to have as part of your presentation to participants at the webex on March 31. All are displays that are from the input or output of the draft base case from which you sent some information last week.

1) A version of the map you sent as Figure 4-3 (page 5 in Rev\_GWMdoel.pdf) drawn either without the wells and the outline of the municipal water service or with the display reconfigured so the contours display above those items instead of being masked by them.

2) Related to 1) above, the contours on Figure 4-3 that you sent out have a tortuosity and complexity in the vicinity of north Yard 520 (partially masked by the municipal service outline and well symbols as currently displayed) that appear to be of too high-frequency to result from simply contouring data that is distributed at 80-ft centers.

To the extent that the contour patterns shown are a hybrid of heads computed by MODFLOW and other control points or mechanisms, a display should be offered that contours only the MODFLOW output and explains the supplemental control used to generate the contour map that was distributed.

3) Map(s) displaying the new distribution of permeabilities in the sub-wetland sands.

4) A map displaying the distribution of drain boundaries in the Great Marsh that also shows the distribution of the boundaries associated with each drain elevation.

5) A map displaying [(GHB head)-(ground surface elevation)]. It would be most useful to contour only positive values, using 1-ft contour intervals.

6) A map displaying [(water table elevation)-(ground surface elevation)]. It would be most useful to contour only positive values, using 1-ft contour intervals.

7) A map showing particle tracks from north Yard 520 for particles that originate on the exterior faces of cells that are located at the edge of the ash in the landfill.

8) A map depicting the cells assigned river boundaries with the individual river reaches identified as defined for the MODFLOW run.

8) A table showing the river boundaries grouped by the reaches defined in the model with layer, row, and column of the cells in each reach and the total water input to or extracted from the model for the reach.

9) The MODFLOW budget for the completed run.

--

Chuck

Charles H. Norris  
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EPA-R5-2013-003300-94

**"Perry, Elizabeth"**  
<Elizabeth.Perry@aecom.com>

03/26/2009 09:54 AM

To "Charles Norris"

cc Timothy Drexler, Bob Kay, pete\_penoyer, mhutson,  
"HERRON, KEVIN", "Bradley, Lisa", "Desai, Maya",  
Paula\_Cuttillo

bcc

Subject RE: Pines model information

Chuck - In response to your questions, briefly:

a, b and c are correct  
d - the Ks were increased, not decreased  
e, f, g are correct, as are the second e, g, then i and j

For the second f, h, and k, there are likely to have been minor adjustments to some of these as part of the re-calibration process (for example, the ponds).

We will go over all inputs during the webex.

Elizabeth

-----Original Message-----

From: Charles Norris [mailto:cnorris@geo-hydro.com]

Sent: Wednesday, March 25, 2009 5:35 PM

To: Perry, Elizabeth

Cc: drexler.timothy@epamail.epa.gov; kay.bob@epamail.epa.gov;  
pete\_penoyer@nps.gov; mhutson@geo-hydro.com; HERRON, KEVIN; Bradley,  
Lisa; Desai, Maya

Subject: Re: Pines model information

Elizabeth,

I have been reviewing the file you sent last week, toward preparing for the planned webex on Mar 31. I wanted to be sure that I understand the changes made to the previous base case to produce this version. As I understand your email and Rev\_GWMDoe1.pdf, the following represent the entirety of the changes between them:

- a) Drain boundaries were added to (as yet unidentified) areas within the Great Marsh. Those boundaries used a common conductance value but use one of three different elevation values.
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- i) There were no changes to the spatial distributions of any of the soil types in any of the layers.
- j) There were no changes in the vertical or horizontal grid discretization.
- k) All other inputs to this model are identical to the model discussed at the previous webex.

Thanks in advance.

Also, there are a number of displays of data from the new draft model that I think would help with understanding of the model and the discussion at the webex next Tuesday. I will be sending a set of recommendations along shortly.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-95

Charles Norris  
<cnorris@geo-hydro.com>  
03/26/2009 01:30 PM

To "Perry, Elizabeth"  
cc Timothy Drexler, Bob Kay, pete\_penoyer, mhutson,  
"HERRON, KEVIN", "Bradley, Lisa", "Desai, Maya",  
Paula\_Cutillo  
bcc  
Subject Re: Pines model information, requested runs

Elizabeth,

Thanks for catching the slip up on d) of my earlier email. I forgot which hand was holding which Table 4-1.

There are four runs that I think would be informative to have available to present at next Tuesday's webex.

- 1) The new draft base model with all Kh and Kv values except those for north Yard 520 increased by a factor of 5.
- 2) The new draft base model with all Kh and Kv values except those for north Yard 520 decreased by a factor of 5.
- 3) The new draft base model with the vertical discretization of the grid modified in north Yard 520 such that the layer thicknesses outside the landfill project across the landfill with consistent or at least proportional thicknesses inside the landfill.
- 4) In the light of the information IDEM provided after the last webex regarding the nature and materials used in the eastern third of south Yard 520, a new draft base model run with south Yard 520 included in the simulation.

From each of these runs, I would recommend presentation of a) head contour map of MODFLOW heads computed for Layer 2 (without municipal service area outline and wells on the display), b) graphical representation of calculated vs observed heads, c) table of relevant statistics for head calibration, and d) map of paths of particles originating from Layer 2 cell faces at the edge of the landfill.

Thank you in advance for any of this you can do.

--

Chuck

Charles H. Norris  
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Denver CO 80206

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EPA-R5-2013-003300-96

"Mark Hutson "  
<mhutson@geo-hydro.com>  
04/06/2009 11:33 AM

To Timothy Drexler  
cc "Charles Norris"  
bcc  
Subject Pines Groundwater Model Review

Tim

Formal project management training teaches that there are three defining factors to any project:

(A) Quality, (B) Cost, and (C) Speed

A project can be run to attain any two of the above, all three together are not achievable. For instance a project can be run to achieve a quality product on a quick timeframe, but a large number of resources (and associated costs) must be applied in order to get that result. Alternatively, a low cost product can be achieved in a short period of time, but the quality of the product obviously suffers.

In the case of the Pines groundwater model GHI is providing review and comments on work produced by ENSR/AECOM. Let's put this task into perspective.

ENSR/AECOM submitted a draft RI on May 19, 2008. At the June 12, 2008 review meeting the RI, especially the groundwater characterization, was roundly rejected for a variety of valid reasons, including groundwater contours that did not reflect topography in and around the landfill. The groundwater model submitted with this document was described by ENSR/AECOM in the RI as calibrated, yet it was so flawed that it could not be calibrated without censoring heads within the landfill from the data set. The only way that we determined that critical data had been censored was a notation at the bottom of a table in the appendix. ENSR/AECOM refused to provide the model files to allow us to see how their model was constructed and constrained. Formal comments on the Draft RI and Model were provided to EPA on July 14, 2008.

From July 14 through December 5, 2008 (**144 days**), ENSR/AECOM re-worked the RI and model to incorporate comment responses and incorporate critical heads within the landfill. The revised RI and groundwater model was resubmitted to EPA on December 5, 2008. Not surprisingly, the groundwater model submitted on

December 5, 2008 showed groundwater surface contours and particle flow paths that were strikingly similar to those depicted in the May model, despite the major changes made. A conference call was held on February 5, 2009 to discuss the revised model. During this call it was pointed out, among other problems, that although ENSR/AECOM claimed that the model was calibrated, there were large areas of the model domain over which the model calculated the head to be 10-20 feet above the land surface, yet ENSR/AECOM submitted it to EPA to be used to guide future decisions. ENSR/AECOM also refused to provide these model files to allow us to see how their model was constructed and constrained.

From February 5, 2008 to March 31, 2009 (**54 days**) ENSR/AECOM again re-worked the model to eliminate the ridiculously high heads in the previous model. This third generation model shows groundwater flow patterns that are again strikingly similar to that calculated by the original and revised models despite that fact that drastic changes to the model have been made, including dramatic changes to the head within the landfill. The description of recent events provided above shows that with enough manipulation, groundwater models are capable of providing the desired results. Careful (high quality) review is necessary to identify errors and omissions that can substantially change model results. It has taken ENSR/AECOM two revisions and **198 days** since comments on the first model were submitted to generate this third generation model.

Quality - Geo-Hydro, Inc. (GHI) will again provide high quality technical comments on the revised RI and third generation model. That is the way we have and will continue to do business. We believe that you will concur that our input to the RI and model have been valuable.

Price - The price to any of the parties for obtaining GHI comments on the model are obviously reasonable. In fact, GHI has been working on behalf of the citizens of Town of Pines without payment since July 2008.

Speed - We hope to get all of the input files necessary to duplicate this third generation model by Monday April 6, 2008 and you have requested all comments on the groundwater model and revised draft RI by Wednesday April 15, (**9 days**). GHI will continue to support the citizens of Town of Pines because we believe that we are the best defense the citizens have. Nine days (including the weekend) to fully explore, understand, and prepare comments on a groundwater model is a Herculean feat under the best conditions. To ask unpaid consultants who are donating their time to perform such a review, while maintaining other paid

projects is beyond reason.

I also question the usefulness of providing comments on the draft RI before the groundwater model has been reviewed, fixed and finalized. We have seen that the ENSR/AECOM is so overly constrained that no matter what input parameters are used, the results vary only little. We are just now about to receive all of the model files that we have requested since June 2008. The currently existing RI contains descriptions of groundwater flow that are based on the obviously flawed model that existed two versions ago. Therefore the RI is now based on a model that has already been shown to be faulty, even without benefit of the electronic files.

In order to streamline the entire process, I believe that we should review the groundwater model and let it be fixed and finalized before we donate even more of our time reviewing an outdated RI.

Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-97

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
04/08/2009 10:12 AM

To Timothy Drexler  
cc "Charles Norris", "Pete Penoyer "  
bcc  
Subject RE: Pine Site GW model

Tim

I just talked with Chuck on his cell phone. He is traveling back home today and will be back in the office tomorrow. At this point he thinks that he has enough information from AECOM and other sources to reconstruct the model but it will require some manual input. Chuck said that he will get back with you tomorrow after he had an opportunity to work on it some more.

Are we still expected to provide comments on the revised RI before the basics of groundwater flow are understood?

Mark

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Wednesday, April 08, 2009 7:45 AM  
To: pete\_penoyer@nps.gov; mhutson@geo-hydro.com; cnorris@geo-hydro.com  
Subject: Pine Site GW model

Does everyone now have what they needed for review of the model?

EPA-R5-2013-003300-98

Charles Norris  
<cnorris@geo-hydro.com>  
04/09/2009 11:33 AM

To Timothy Drexler  
cc Pete\_Penoyer, Mark Hutson  
bcc  
Subject Pines groundwater models

Tim,

I have materials from which I can reconstruct a close approximation of AECOM's model. I did not receive the requested plug-and-go files that would guarantee I'm starting with exactly what they used.

For example, what observation data they sent does not include RI names for the observation points or well screen intervals, which requires cross verification of wells based upon file heads vs RI table heads and pulling screen intervals from other RI data sources. As further example, the heads AECOM provide were sent as printout in the \*.out file, rather than as a "head" file directly importable into MODFLOW 2000. I will have to construct the head file with a script or Fortran program before being able to use it. There will probably be other examples, but I'm working through those now.

I have also established that there are differences between the MODFLOW 2000 user interface GHI uses (Visual MODFLOW Professional (the "Waterloo program")) and the user interface that AECOM uses (GMS). For example, Visual MODFLOW does not allow the layer thickness to be zero in the input to MODFLOW, which apparently GMS does allow. Also, I will not be able to define multiple drain boundaries in a single cell (same for river boundaries and general head boundaries). Thus to make AECOM's "calibration" run will require making changes in the input, and the runs will not be identical. The changes should have minimal impacts (which will be verified, of course), but AECOM has a model that will not run in our Visual MODFLOW without modification, and there will be inherent deniability of any results. Presumably if something significant is observed in any runs we make, AECOM will be able to simply incorporate the changes in their model to establish the impacts their model computes.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-99

**Timothy  
Drexler/R5/USEPA/US**  
04/09/2009 05:12 PM

To Charles Norris  
cc  
bcc  
Subject Re: Pines groundwater models

Thanks, Chuck. Please let me know how it goes.

-Tim

Charles Norris <cnorris@geo-hydro.com>

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
04/09/2009 11:33 AM

To Timothy Drexler/R5/USEPA/US@EPA  
cc Pete\_Penoyer@nps.gov, Mark Hutson  
<mhutson@geo-hydro.com>

Subject Pines groundwater models

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--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-100

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
04/10/2009 04:59 PM

To "Perry, Elizabeth"  
cc Pete\_Penoyer, Paula\_Cuttillo, Bob Kay, Timothy Drexler,  
Mark Hutson  
bcc  
Subject Model data

Elizabeth,  
I have been working to construct a data file for the well, piezometer,  
and surface water observation points. I've been cross-matching the data  
in the \*.hob file with various tabular data you have sent to find the  
equivalent monitoring point location for the Point designation hednn  
used in the \*.hob file.

It appears the sequence in the \*.hob file largely matches that of  
Appendix L, Table 4-2 you sent in March 2009 as opposed to RI Report,  
Table 2-2 from December 2008. There is, however, an inconsistency for  
hed41. By elimination, Point hed41 of file \*.hob is equivalent to  
monitoring well TW-17S. However, the observed (average) head is  
different for TW-17S in Table 2-2 (in RI Report, December 2008) and  
Table 4-2 (in both Appendix L, March 2009, and \*.hob).

Is Point hed41 in \*.hob real world observation point TW-17S  
What observed (average) head should be used with this observation point?

Thank you.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
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(303) 322-3171

EPA-R5-2013-003300-101

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**

04/13/2009 01:09 PM

To Timothy Drexler

cc

bcc

Subject Background soils

Tim

I was wondering how much time I need to spend in our comments talking about outliers in the background data. At one point when we were talking about the plots of background soil values that I did you had said that EPA was going to assign a geostatistician to look at the data. Did that ever happen?

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-102

"Perry, Elizabeth"  
<Elizabeth.Perry@aecom.com  
>

04/13/2009 02:14 PM

To "Charles Norris"

cc Pete\_Penoyer, Paula\_Cuttillo, Bob Kay, Timothy Drexler,  
"Mark Hutson", "Bradley, Lisa", "Desai, Maya"

bcc

Subject RE: Model data

Chuck - It looks like the calibration target for hed41 (TW-17S) is 613.92 as shown on Table 2-2 of Apx L (rather than 613.91 shown on Table 4-2). Elizabeth

-----Original Message-----

From: Charles Norris [mailto:cnorris@geo-hydro.com]

Sent: Friday, April 10, 2009 6:00 PM

To: Perry, Elizabeth

Cc: Pete\_Penoyer@nps.gov; Paula\_Cuttillo@nps.gov;

kay.bob@epamail.epa.gov; Drexler.Timothy@epamail.epa.gov; Mark Hutson

Subject: Model data

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What observed (average) head should be used with this observation point?

Thank you.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-103

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
04/13/2009 02:31 PM

To "Perry, Elizabeth"  
cc Pete\_Penoyer, Paula\_Cuttillo, Bob Kay, Timothy Drexler,  
Mark Hutson, "Bradley, Lisa", "Desai, Maya"  
bcc  
Subject Re: Model data

> (rather than 613.91 shown on Table  
> 4-2).

Elizabeth,  
More importantly, the wrong number is in the observation file used by  
the program, not just the summary table. May I assume it will be  
changed there, prior to final publication?  
--

Chuck

Charles H. Norris  
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Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-104

**Timothy  
Drexler/R5/USEPA/US**  
04/14/2009 09:18 AM

To "Mark Hutson"  
cc  
bcc  
Subject Re: Background soils

Hi Mark:

I am having Dr. John Bing-Canar, my stat reviewer, evaluate the Pines soil results with emphasis on the background samples.

-Tim

"Mark Hutson" <mhutson@geo-hydro.com>

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
04/13/2009 01:09 PM

To Timothy Drexler/R5/USEPA/US@EPA  
cc

Subject Background soils

Tim

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Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-105

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
04/15/2009 01:53 PM

To Timothy Drexler  
cc "Charles Norris", "Mark Hutson ", "Pete Penoyer "  
bcc  
Subject GHI Non-Groundwater Comments

Tim

On behalf of PINES, I am attaching our comments on the non-groundwater related topics on the Revised Draft Remedial Investigation Report on the Pines site. Please let me know if you have questions or need clarification on any of these issues.

Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



NonGW Comments on Revised Draft RI 041509\_final.pdf

EPA-R5-2013-003300-106

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
04/19/2009 01:58 PM

To "Perry, Elizabeth"  
cc Pete\_Penoyer, "HERRON, KEVIN", Bob Kay, Timothy  
Drexler, Mark Hutson  
bcc  
Subject Data entry error in Model?

Elizabeth,

I believe there may be an error in the parameterization of the unnamed river/ditch draining the western half of the Great Marsh. It appears the end-value stages were assigned to the wrong ends of the river reach.

As parameterized in the model you sent us, this drainage system simulates a stream flowing into the Great Marsh from the southwest, rather than one draining to the southwest from Great Marsh. Would you concur that the drainage in question flows to the southwest and that the simulated gradient on this feature is reversed relative to the real stream gradient?

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-107

Charles Norris  
<cnorris@geo-hydro.com>  
04/19/2009 03:11 PM

To "Perry, Elizabeth"  
cc Pete\_Penoyer, "HERRON, KEVIN", Bob Kay, Timothy  
Drexler, Mark Hutson  
bcc

Subject Simulated heads used for calibration

Elizabeth,

Although Visual Modflow will not accept all of input you sent without modification, the overall model appears to perform extremely closely to your model, when run with your choice of solver and solver settings. The total budget values are within one-hundredth of a percent or less, and simulated heads rarely differ from your heads at the resolution of two significant digits that you sent us. Given the overall similarity of your and our model results, I am somewhat surprised at the size of the differences between your and our runs in the "simulated heads" assigned to the observation points.

Since we were not provided with the input files for observation points and have had to build this input instead of import it, there is obviously the opportunity for some differences there. I'm confident we are using the same X Y values you sent us for the observation. The Z control we are using is extracted from the December 5, 2008, draft RI Report tables such as Tables 2-6, 2-8, and construction diagrams, which presumably are a match for your vertical control. But, there are subtle differences that don't appear to be related to typos or data choices.

I am wondering if there are differences in the methods between how GMS (as implemented for your simulation) and Visual Modflow (as implemented here) interpolate the head at the XYZ of an observation point. Toward evaluating possible differences, do you know the following details about how GMS does that interpolation? (If there are different interpolation possibilities, I'm just interested in the one(s) you used.)

Is the GMS interpolation based upon the geometry of the cell-centered simulated heads and the position of the observation point, or does the interpolation include consideration of the hydraulic conductivities of the cells involved in the interpolation?

Does GMS interpolated using the position of the observation point relative to cell-center simulated heads within the representative elemental volume structure of the grid, or does it interpolate based upon the XYZ of the cell centers and the XYZ of the observation point?

Does GMS interpolate algebraically based on the relevant face-adjacent cell-center heads and the cell position of the observation point, or does it use a more complex algorithm?

If the algorithm is more complex, does it include an evaluation of changes in gradients (gradient derivatives) proximal to the cell containing the observation point?

Thanks in advance for any insight you can provide.

--

Chuck

Charles H. Norris  
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1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-108

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
04/22/2009 04:17 PM

To Bob Kay  
cc Timothy Drexler, Pete\_Penoyer, Paula\_Cutillo, Elizabeth  
Perry, Mark Hutson, "HERRON, KEVIN"  
bcc  
Subject USGS information

Bob,  
Would you be able to provide the completion intervals and any head data  
for the USGS well nests in the Great Marsh used in the RI report  
groundwater model and those along US 20 adjacent to north Yard 520  
and/or Brown Ditch? There are dribs and drabs in the various  
investigation documents or representations on some figures, but finding  
a single coherent set of the data associated with them from the project  
documents escapes me. Thanks for any help.

--

Chuck

Charles H. Norris  
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1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-109

**Charles Norris**  
<[cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)>  
05/04/2009 02:38 AM

To: Timothy Drexler  
cc  
bcc  
Subject: Appendix L

Tim,  
Attached are our comments on Appendix L. Sorry they're so long. I'm sure they could use editing for redundancy and excess words, but I wanted to get them to you. I'll send the comments on the groundwater/modeling comments from the RI Report itself once I have review them.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
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Denver CO 80206

(303) 322-3171



20090504Comments on revised Draft RI.pdf

EPA-R5-2013-003300-110

**Charles Norris**  
**<cnorris@geo-hydro.com>**  
05/07/2009 11:02 AM

To Timothy Drexler  
cc Mark Hutson  
bcc

Subject I'll be in Chicago May 18

Tim,  
I will be in the Chicago the weekend after next and don't fly home until Tuesday May 19. I am currently planning to be downtown on Monday and thought it might be a good idea to meet with you to go over details of the model that are difficult to capture in text. I believe we could easily fill a half-day productively, but even an hour would be good. Please let me know of any interest.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-111

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
08/18/2009 10:20 AM

To Timothy Drexler  
cc  
bcc  
Subject Pines Call

Tim

Are we still scheduled for a conference call tomorrow morning?  
Is there a call in number?

Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-112

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

09/15/2009 11:54 AM

To Timothy Drexler

cc

bcc

Subject GHI Non GW comments

Tim

Here is a Word version of our comments.

Mark Hutson

Geo-Hydro, Inc.

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



NonGW Comments on Revised Draft RI 041509\_final.doc

EPA-R5-2013-003300-113

**Timothy  
Drexler/R5/USEPA/US**  
09/15/2009 11:56 AM

To "Mark Hutson"  
cc  
bcc  
Subject Re: GHI Non GW comments

Thanks a lot, Mark. We'll be talking very soon.

-Tim

-----"Mark Hutson" <[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)> wrote: -----

To: Timothy Drexler/R5/USEPA/US@EPA  
From: "Mark Hutson" <[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>  
Date: 09/15/2009 11:54AM  
Subject: GHI Non GW comments

Tim

Here is a Word version of our comments.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

[attachment "NonGW Comments on Revised Draft RI 041509\_final.doc" removed by Timothy Drexler/R5/USEPA/US]

EPA-R5-2013-003300-114

**Charles Norris**  
<[cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)>  
09/15/2009 12:25 PM

To Mark Hutson  
cc Timothy Drexler  
bcc  
Subject Pines model conversation

Mark,  
Thank you for the call summarizing your conversation with Tim Drexler this morning. Please email me a written summary of the call as you remember it. Also, please cc Tim on the email, so that he can clarify any discussion points that he recalls differently.

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-115

"HERRON, KEVIN"  
<KHERRON@idem.IN.gov>

09/16/2009 07:47 AM

To Timothy Drexler

cc

bcc

Subject FW: Additional Comments for the Town of Pines Modleing

Tim:

This is the email response I received from the IDEM Geologist-Hydrogeologist this morning regarding EPA's decision on the Groundwater Model for the Town of Pines. I have asked him to confirm that eliminating the GW Model is acceptable to him and will let you know as soon as possible his response.

Hope your field work is going ood and have safe travels!

*Kevin*

---

**From:** SPINDLER, KEVIN

**Sent:** Wednesday, September 16, 2009 8:32 AM

**To:** HERRON, KEVIN

**Subject:** RE: Additional Comments for the Town of Pines Modleing

Hi Kevin,

Sorry, I was out in the field all day yesterday.

I looked over Ada's comments about the groundwater model, and the "way forward" paragraph, and I am in agreement.

Thanks,

*Kevin Spindler*  
**OLQ Geological Services**  
**(317) 234-4156**

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---

**From:** HERRON, KEVIN

**Sent:** Tuesday, September 15, 2009 2:53 PM

**To:** CRAWFORD, BILLY; Horein, Susan; SPINDLER, KEVIN

**Subject:** FW: Additional Comments for the Town of Pines Modleing

Hello Lady and Gentlemen:

The attachments are the result of the EPA Ada Groundwater Modeling evaluation. I am sure that you will get a kick out of it. I have already approved the language presented in the "gw model wayforward.doc" attachment. EPA needed and wanted a response today and I was unable to chat with any of you after receiving it and checking at your desks several times. It is no big deal. Basically, the model is getting thrown out of the RI Report completely. You can read the attachments as you feel necessary and need to know. Let me know if you believe that EPA and my actions are inappropriate or problematic.

Thanks,

*Kevin*

---

**From:** Drexler.Timothy@epamail.epa.gov [mailto:Drexler.Timothy@epamail.epa.gov]  
**Sent:** Tuesday, September 15, 2009 11:32 AM  
**To:** HERRON, KEVIN  
**Subject:** Fw: Additional Comments for the Town of Pines Modleing

Kevin-  
Let me know when you receive this.  
-Tim

-----Forwarded by Timothy Drexler/R5/USEPA/US on 09/15/2009 10:25AM -----

To: kherron@dem.state.in.us  
From: Timothy Drexler/R5/USEPA/US  
Date: 09/14/2009 12:22PM  
cc: Bob Kay/R5/USEPA/US  
Subject: Fw: Additional Comments for the Town of Pines Modleing

Hi Kevin:

I finally got this report from the Ada, OK folks regarding the Pines Site GW model. They do not think it is workable as is. I asked them about the comments raised by NPS and GeoHydro and they say that if they calibrate the model to a 5% tolerance, those other problems will also be fixed. I do not want to spend the next 6 months of our lives doing this. I talked to my Section Chief and she's OK with just letting the model go. It was never a requirement in the Order.

I've attached language I drafted for the RI Report. Let me know what you think. I will then tell NPS and GeoHydro and then finish the RI Report comments, possibly with a conditional approval so that we can get going.

-Tim

-Tim

-----Forwarded by Timothy Drexler/R5/USEPA/US on 09/14/2009 12:09PM -----

To: Timothy Drexler/R5/USEPA/US@EPA  
From: David Burden/ADA/USEPA/US  
Date: 09/09/2009 05:32PM  
Subject: Additional Comments for the Town of Pines Modleing

Tim,

Please find attached the additional modeling comments for you to review. I will send a final signed hard copy via the mail.

Dave

---

David S. Burden, Ph.D., Acting Chief  
Technical & Administrative Support Staff

Ground Water and Ecosystems Restoration Division  
National Risk Management Research Laboratory  
U.S. Environmental Protection Agency  
P.O. Box 1198  
Ada, OK 74821-1198

Eml: [burden.david@epa.gov](mailto:burden.david@epa.gov)  
Office: 580-436-8606  
Cell: 580-583-5672

EPA-R5-2013-003300-116

**Charles Norris**  
<cnorris@geo-hydro.com>

11/03/2009 08:11 PM

To Timothy Drexler

cc Mark Hutson

bcc

Subject My misstatement at the PINES meeting

Tim,

I went over our timesheets and invoices to PINES to develop the numbers to the effort pre- and post- PINES signing the amendment to the TAP agreement. From email traffic, I had thought PINES signed the amendment in early April. In the review, I first noticed Bud's signature was not until May 5, after most of the heavy lifting. Sorry I misspoke at the meeting.

[Note that this does not change a whit GHI's view on the issues or an appropriate resolution. I'm just correcting a misstatement I made in response to what I thought at the time was an inaccurate comment.]

--

Chuck

Charles H. Norris  
Geo-Hydro, Inc.  
1928 E 14th Avenue  
Denver CO 80206

(303) 322-3171

EPA-R5-2013-003300-117

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

01/14/2010 12:40 PM

To Timothy Drexler

cc

bcc

Subject Regional Screening Levels

Tim

It appears you've been busy. Could you either send me or direct me to the Regional Screening Levels that get referenced in the comments?

Thanks

Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-118

**"Bradley, Lisa"**  
<lisa.bradley@aecom.com>

01/26/2010 02:29 PM

To Timothy Drexler

cc

bcc

Subject RE: Pines - Gamma Survey

Thanks! :) LAIS

-----Original Message-----

From: Drexler.Timothy@epamail.epa.gov  
[mailto:Drexler.Timothy@epamail.epa.gov]  
Sent: Tuesday, January 26, 2010 11:32 AM  
To: Bradley, Lisa  
Subject: Re: Pines - Gamma Survey

Hi Lisa:

Attached please find the gamma survey conducted by Larry Jensen for  
P.I.N.E.S.

-Tim

(See attached file: Gamma\_survey\_LJensen.PDF)

EPA-R5-2013-003300-119

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
02/28/2010 05:08 PM

To Timothy Drexler  
cc "Charles Norris"  
bcc  
Subject Pines Background Soil and Sediment Data

Tim

I am spending part of my Sunday looking through the Ecological Risk Assessment to see what has been done and notice that the the soil and sediment samples seem to be compared to "background" with no distinction between organic and granular materials as was requested by EPA in the comments. I also note that there is no mention of looking at the "background" microscopically to see if CCB is present in the samples. Did I miss something or did they not do these requested checks of background data quality. I would have thought that these issues would be discussed in the risk assessment if they were indeed performed.

Mark

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-120

"Mark Hutson "  
<mhutson@geo-hydro.com>  
03/12/2010 04:58 PM

To Timothy Drexler  
cc  
bcc  
Subject EPA Approvable Language

Tim

Here are a couple of examples of locations where the EPA Approvable Language was not included or was modified in the final RI.

Mark

**Comment #5: There is insufficient evidence to state conclusively that CCB-derived contaminants in groundwater do not extend to areas where private wells are located outside of the area currently supplied by municipal water. The radial plots, piper diagrams, and boron isotope ratios presented cannot be used to definitively claim that the metals present in some monitoring and private wells outside of the area supplied by municipal water are either exclusively or mostly from either deep geologic formations or other contaminant sources such as landfills that do not contain CCBs.**

**EPA Approvable Language #5:** Executive Summary, Pg. ES-5, Para 4: Edit to state:  
“Groundwater directly south of Yard 520 and Brown Ditch appears to be impacted by a landfill to the south. Increased boron concentrations in monitoring wells in this area are most likely a result of landfill contaminants. Without additional information, however, some contribution from CCB sources other than Yard 520 cannot be ruled out. In the area near the intersection of South Railroad Avenue and Ardendale where a significant accumulation of CCBs is known in residential yards and as road sub-base, CCB impacts to groundwater are more likely. One residential well was tested by EPA to be above the screening level for boron. Therefore, where groundwater is used as a source of drinking water in some parts of the study area, residents may ingest CCB-derived contaminants that have migrated into groundwater.” Likewise, see Comment #52 and any other part of the RI Report that makes a similar statement.

## **Text in Final RI**

### **Page ES-5**

Groundwater directly south of Yard 520 and Brown Ditch appears to be impacted by a landfill to the south (Pines Landfill, owned by Waste Management). Increased B concentrations in monitoring wells in this area are most likely a result of landfill contaminants. **While Yard 520 is not a source of CCB-derived constituents in this area**, without additional information, however, some contribution from other potential CCB sources cannot be ruled out.

In the area near the intersection of South Railroad Avenue and Ardendale where CCBs have been used in residential yards and driveways and as road sub-base, CCB impacts to groundwater **might have occurred**. One residential well was tested by EPA to be above the screening level for boron,

although the private well located across the street (PW010) was sampled four times over the course of a year (2006 – 2007) and the boron concentrations were much below the comparison level. Therefore, in this part of the study area, which is not served by municipal water, CCB-derived constituents may have migrated into groundwater; this potential pathway will be evaluated in the HHRA.

**Comment #52:** Likewise, the RI data does not definitively prove that the extent of CCB-derived constituents in groundwater does not extend to areas where private wells are located outside the area currently supplied by municipal drinking water (see previous comments) Please remove.

**Response #52:** Text in Section 4.4.7, 7<sup>th</sup> bullet, will be modified to read: “Groundwater in areas where private wells are located outside the area currently supplied by municipal drinking water does not currently appear to be impacted by CCB-derived constituents, based on available data. At best, the data may reflect a very minor impact which any CCBs at the ground surface might have on groundwater in this area.”

**EPA Approvable Language #52:** Substantial boron concentrations (more than 500 ppb in some instances) were detected, which cannot be credibly considered background for the shallow aquifer and is not a "very minor impact". Edit as per EPA approvable language #5.

**Text in Final RI section 4.4.7  
page 4-40**

- Groundwater in areas where private wells are located outside the area currently supplied by municipal drinking water does not currently appear to be impacted by CCB-derived constituents, based on available data. At best, the data may reflect a very minor impact which any CCBs at the ground surface might have on groundwater in this area. This potential pathway will be evaluated in the human health risk assessment.

Editing as per EPA approvable language #5 was not done.

Mark Hutson  
Geo-Hydro, Inc.  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-121

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**

03/23/2010 04:37 PM

To Timothy Drexler

cc

bcc

Subject Pines Historical Analyses

Tim

Last week at the Pines public meeting I told you about looking at the historical record of IDEM water quality data and seeing that MW-6 CCB-related parameters do not seem to have stabilized and in fact appear to be continuing to increase. I haven't done a complete analysis (since we're not getting paid to do any of this) of the existing data but focused on MW-6 since the monitoring reports consistently identify MW-6 as increasing in CCB-related concentrations. I am attaching a few plots that illustrate what I see. I'm not sure if MW-6 is the closest well to the edge of the waste, or if there is just a better hydraulic connection between the landfill and MW-6. In any event the chemistry of MW-6 continues to deteriorate.

To me, this either indicates that the soluble constituents in the CCB are continuing to leach out and increase their groundwater concentrations, or the leachate from the center of the site that had more residence time in the CCBs is just now starting to leave the site and be detected in MW-6. Another explanation may be that the water-table mound in the north cell may have reached a point a few years ago that the amount of leachate being driven to the north has increased and is starting to show up at MW-6. In any event, it appears to me that the concentrations of CCB-related constituents in RI groundwater samples may not be representative of future concentrations.

We would have had a much better idea of what to expect if we had been successful in getting the PRP's to sample leachate quality inside the landfill. We'd then know what the true leachate source concentration is. Without that information, whatever conservative risk management approaches that EPA takes will have to take into account unknown leachate source concentrations and resulting variability of future plume concentrations.

Is there any way that EPA could talk with IDEM about monitoring of the site and get IDEM to require monitoring inside the landfill? Ever since PZ001 was eliminated Brown has restarted submitting monitoring reports to IDEM that show groundwater flowing from the neighborhood into the landfill! I'm attaching a recent map from their report that shows this. It doesn't reflect well on either agency to have reports submitted by the same PRPs, on the same site, showing groundwater flow flowing in opposite directions. It is especially disturbing that IDEM is letting them designate MW-6 as an upgradient well when we all know that is not really the case.

I thought that I'd send you this so you'd have a better idea what I was talking about at the meeting.

Have a good day.

Mark

Mark Hutson

Geo-Hydro, Inc.

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



MW6 Historical Analyses.pdfYard 520 October 2009 Water Table Map.pdf

EPA-R5-2013-003300-122

**DSullivan@NiSource.com**

10/15/2010 10:25 AM

To Timothy Drexler, kherron

cc Matthew Ohl

bcc

Subject TAP Progress Report - Pines

Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap7910.pdf)

Dan Sullivan

NiSource Environmental Safety & Sustainability



(219) 647-5248 **tap7910.pdf**

EPA-R5-2013-003300-123

**Larry Johnson /R5/USEPA/US**

10/21/2010 12:06 PM

To Matthew Ohl, Timothy Drexler

cc DDertke, SSchacht, Larry Kyte

bcc

Subject RE: Town of Pines

FYI - received today 10/21.



10-21-10 to Ferraro re TAP-\$86K.pdf

EPA-R5-2013-003300-124

"Bradley, Lisa"  
<lisa.bradley@aecom.com>

11/15/2010 08:32 AM

To: Matthew Ohl

cc

bcc

Subject: RE: PINES

Thanks. I think that PINES is asking for you to contact GeoHydro directly (in addition to us sending the draft HHRA files) and discuss with them where we are in the process, etc. It may be a good opportunity to clarify objectives with them as well. Just in case that was not in your plans... :) ALSI

**From:** Ohl.Matthew@epamail.epa.gov [mailto:Ohl.Matthew@epamail.epa.gov]

**Sent:** Monday, November 15, 2010 7:44 AM

**To:** Bradley, Lisa

**Subject:** Fw: PINES

FYI: Here is the direction you were asking about from Larry Johnson in our Office of Regional Counsel. Thank you.

Matthew J. Ohl  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

----- Forwarded by Matthew Ohl/R5/USEPA/US on 11/15/2010 06:41 AM -----

From: Larry Johnson/R5/USEPA/US  
To: "Rodriguez, Gabriel M." <grodriguez@schiffhardin.com>  
Date: 11/09/2010 02:37 PM  
Subject: Re: FW: PINES

---

Hi Gabe,

We certainly believe it a good idea that the Group be brought up to speed so it can furnish a budget and workplan, so go ahead and furnish the Group the website with the latest human health risk assessment and anything else it may need to get the budget process going. Thanks.

Larry

**FW: PINES**

**Rodriguez, Gabriel M.**

to: Larry Johnson

11/08/2010 11:57 AM

---

Larry,

I got this email from Kim Ferraro this morning . Do you know whether EPA will be contacting Geo-Hydro to get him up to speed on status ? As I mentioned last week, she suggested such a call so he could take a stab at the scope /budget.

Gabe

Gabriel M. Rodriguez  
Schiff Hardin LLP  
233 South Wacker Drive  
Suite 6600  
Chicago, Illinois 60606

Tel 312-258-5516  
Fax 312-258-5600  
Email [grodriguez@schiffhardin.com](mailto:grodriguez@schiffhardin.com)

---

**From:** Kim Ferraro [<mailto:kim.ferraro@leafindiana.org>]  
**Sent:** Monday, November 08, 2010 9:55 AM  
**To:** Rodriguez, Gabriel M.  
**Cc:** 'Charles Norris'  
**Subject:** PINES

Dear Mr. Rodriguez,

I informed Charles Norris with GeoHydro, Inc. of our phone conversation last week. He is awaiting receipt of information relative to the current status of the RI/FS and expected remaining activities so that GeoHydro can prepare a proposed budget for going forward. Please let me know when Mr. Norris should expect to receive this information.

Thank you for your cooperation.

Kim Ferraro  
Executive Director  
[Legal Environmental Aid Foundation \(LEAF\) of Indiana, Inc.](#)  
150 Lincolnway, Suite 3002  
Valparaiso, IN 46383

219/464-0104

fax: 464-0115

**From:** Martin, Debbie [<mailto:dmartin@schiffhardin.com>]  
**Sent:** Thursday, October 21, 2010 12:45 PM  
**To:** 'kim.ferraro@leafindiana.org'  
**Cc:** Rodriguez, Gabriel M.; 'Johnson.Larry@epamail.epa.gov'  
**Subject:** Pines - 10/21/10 Letter re TAP-\$86K

The attached is for your information and file. A hard will copy will also follow via regular mail. Thanks much.

## Debbie Martin

Assistant to Gabriel M. Rodriguez

and Renee Cipriano

**SCHIFF HARDIN LLP**

233 S. Wacker Drive, Suite 6600

Chicago, IL 60606

(312) 258-4909

(312) 258-5600 (Fax)

Hrs. 8:30am to 4:30pm

[dmartin@schiffhardin.com](mailto:dmartin@schiffhardin.com)



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-----

EPA-R5-2013-003300-125

**"Mark Hutson "**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>  
11/15/2010 05:37 PM

To Matthew Ohl  
cc "Chuck Norris"  
bcc  
Subject Pines TAP Scope of Work

Matt

As a follow-up to our phone conversation I thought I'd run the following list of tasks to be included in the our scope of work past you . Please let me know if I've forgotten something or have something on the list that should not be there .

- Review and comment on second draft of the Human Health Risk Assessment
- Review and comment on an assumed third draft of the Human Health Risk Assessment
- Review and comment on the draft Ecological Risk Assessment
- Review and comment on the second draft Ecological Risk Assessment
- Review and comment on the draft Identification of Remedial Action Objectives Technical Memorandum
- Review and comment on the second draft of the Remedial Action Objectives Technical Memorandum
- Review and comment on the draft Development and Screening of Alternatives Technical Memorandum
- Review and comment on the second draft Development and Screening of Alternatives Technical Memorandum
- Review and comment on the draft Feasibility Study
- Review and comment on the second draft Feasibility Study
- Review and comment on the draft Proposed Plan
- Review and comment on the final Proposed Plan
- Review and comment on the draft Record of Decision
- Review and comment on the final Record of Decision

As we discussed, we will put together our scope of work and budget based on our estimate of what it will take to complete the above tasks . Let me know if you see anything that is not as discussed.

It was nice talking with you.

Mark

**Mark Hutson**  
Geo-Hydro, Inc.  
(303)948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-126

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
11/16/2010 12:27 PM

To Matthew Ohl  
cc  
bcc  
Subject FW: Pines TAP Scope of Work

Matt

Did you see anything on here that needs to be changed?  
I want to get started on the scope of work and budget.

Mark

-----Original Message-----

**From:** Mark Hutson [mailto:mhutson@geo-hydro.com]  
**Sent:** Monday, November 15, 2010 4:38 PM  
**To:** Matt Ohl  
**Cc:** Chuck Norris  
**Subject:** Pines TAP Scope of Work

Matt

As a follow-up to our phone conversation I thought I'd run the following list of tasks to be included in the our scope of work past you . Please let me know if I've forgotten something or have something on the list that should not be there .

- Review and comment on second draft of the Human Health Risk Assessment
- Review and comment on an assumed third draft of the Human Health Risk Assessment
- Review and comment on the draft Ecological Risk Assessment
- Review and comment on the second draft Ecological Risk Assessment
- Review and comment on the draft Identification of Remedial Action Objectives Technical Memorandum
- Review and comment on the second draft of the Remedial Action Objectives Technical Memorandum
- Review and comment on the draft Development and Screening of Alternatives Technical Memorandum
- Review and comment on the second draft Development and Screening of Alternatives Technical Memorandum
- Review and comment on the draft Feasibility Study
- Review and comment on the second draft Feasibility Study
- Review and comment on the draft Proposed Plan
- Review and comment on the final Proposed Plan
- Review and comment on the draft Record of Decision
- Review and comment on the final Record of Decision

As we discussed, we will put together our scope of work and budget based on our

estimate of what it will take to complete the above tasks . Let me know if you see anything that is not as discussed.  
It was nice talking with you.

Mark

**Mark Hutson**

Geo-Hydro, Inc.

(303)948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-127

**Larry Johnson /R5/USEPA/US**

11/24/2010 11:14 AM

To "Rodriguez, Gabriel M."

cc

bcc Matthew Ohl

Subject Re: FW: PINES Proposed Budget/Workplan

Okay, but it won't be until next week.

FW: PINES Proposed Budget/Workplan

**FW: PINES Proposed Budget /Workplan**

**Rodriguez, Gabriel M.** to: Larry Johnson

11/24/2010 09:57 AM

---

Larry- We should talk before EPA makes any decisions about this.

gabe

-----Original Message-----

From: Kim Ferraro [mailto:kim.ferraro@leafindiana.org]

Sent: Tuesday, November 23, 2010 1:32 PM

To: Ohl.Matthew@epamail.epa.gov; Johnson.Larry@epamail.epa.gov;

Pope.Janet@epamail.epa.gov; Rodriguez, Gabriel M.

Cc: 'Paul Kysel'; 'Jan Nona'; 'Mark Hutson'; 'Chuck NorrisH2Oconsultant'

Subject: PINES Proposed Budget/Workplan

All,

As promised, attached is a proposed "TAP Scope of Work and Budget Through Record of Decision" prepared by PINES' consultants, GeoHydro, Inc. You'll note that the proposed scope of work/budget is based on tasks identified by Matt Ohl as necessary to enable PINES' participation through EPA's issuance of the ROD. GeoHydro has estimated a budget of \$86,950 for completing these tasks assuming nothing "other than review and written commenting" of deliverables submitted by Respondents is required.

Once EPA and Respondents have had an opportunity to review the proposed work plan/budget, I recommend that we schedule a meeting to discuss how the remaining \$36,950 will be addressed.

Thank you for your attention. I look forward to hearing from you.

Regards,

Kim Ferraro

Executive Director

Legal Environmental Aid Foundation (LEAF) of Indiana, Inc.

150 Lincolnway, Suite 3002

Valparaiso, IN 46383

219/464-0104  
fax: 464-0115

-----Original Message-----

From: Ohl.Matthew@epamail.epa.gov [mailto:Ohl.Matthew@epamail.epa.gov]  
Sent: Monday, November 15, 2010 10:02 AM  
To: DSullivan@NiSource.com; vblumenfeld@bibtc.com; 'r.nona'; 'Paul Kysel';  
'Charles Norris'; 'Mark Hutson'; kim.ferraro@leafindiana.org;  
lisa.bradley@aecom.com; Johnson.Larry@epamail.epa.gov;  
Pope.Janet@epamail.epa.gov  
Subject: Pines Site - Information Sharing

Good morning:

Please see the attached letter.

Thank you.

(See attached file: PINES Information Sharing FINAL.pdf) Thank you.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

-----  
Tax Matters: To the extent this message or any attachment concerns  
tax matters, it is not intended or written to be used, and cannot  
be used by a taxpayer, for the purpose of avoiding penalties  
that may be imposed on the taxpayer under law.  
-----

This message and any attachments may contain confidential  
information protected by the attorney-client or other privilege.  
If you believe that it has been sent to you in error,  
please reply to the sender that you received the message in  
error. Then delete it. Thank you.  
-----

[attachment "20101122 Pines TAP Workplan and Budget.pdf" deleted by Larry  
Johnson/R5/USEPA/US]

EPA-R5-2013-003300-128

**"Bradley, Lisa"**  
<lisa.bradley@aecom.com>

12/10/2010 02:29 PM

To Matthew Ohl

cc

bcc

Subject Pines File Downloads

Matt – just to update you, of the people we included on the latest risk assessment file distribution list, only Brenda Waters, Greg Eckert and Ed Karecki have downloaded the files. The files will expire at 6 PM Eastern on Monday. Have a good weekend! :) LAIs

**Lisa JN Bradley, Ph.D., DABT**  
Senior Toxicologist and Vice President, Environment  
D 978-589-3059 C 978-846-3463  
[lisa.bradley@aecom.com](mailto:lisa.bradley@aecom.com)

**AECOM**  
2 Technology Park Drive, Westford, MA 01886  
T 978-589-3000 F 866-758-4856  
[www.aecom.com](http://www.aecom.com)

EPA-R5-2013-003300-129

**DSullivan@NiSource.com**

01/14/2011 02:31 PM

To Matthew Ohl, kherron

cc

bcc

Subject TAP Progress Report - Pines

Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap410.pdf)

Dan Sullivan

NiSource Environmental Safety & Sustainability



(219) 647-5248 **tap410.pdf**

EPA-R5-2013-003300-130

**DSullivan@NiSource.com**

04/15/2011 02:46 PM

To Matthew Ohl, kherron

cc

bcc

Subject TAP Progress Report - Pines

Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap111.pdf)

Dan Sullivan

NiSource Environmental Safety & Sustainability



(219) 647-5248 **tap111.pdf**

EPA-R5-2013-003300-131

**Matthew Ohi/R5/USEPA/US**

04/18/2011 10:15 AM

To DSullivan, vblumenfeld, lisa.bradley

cc Timothy Thurlow

bcc

Subject Town of Pines

Good morning:

I understand from Town of Pines Building Commissioner, Allen Murray that the culvert at the edge of Ardendale Rd. about twenty ft. north of the intersection of US Highway 20 and Ardendale Rd. has been causing a hole to open at the edge of the road. Mr. Murray stated that the Town of Pines has had to fill the hole previously and recently excavated the location finding that a section of 4 ft. metal culvert was removed during the municipal water service extension and replaced with a 3 ft. plastic culvert was sleeved into the remaining metal culvert. Mr. Murray stated his understanding of the settlement agreement is that existing utilities, roads, etc. would be restored to their original condition and not replaced with lesser materials. Please advise what action you are prepared to take in response to this issue.

Thank you.

Matthew J. Ohi

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohi.matthew@epa.gov

EPA-R5-2013-003300-132

**"Val Blumenfeld"**  
**<VBLUMENFELD@bibtc.com**  
**>**

04/18/2011 03:51 PM

To Matthew Ohl

cc

bcc

Subject RE: Town of Pines

I should hear from D&M Excavating this week.  
VB

-----Original Message-----

From: Ohl.Matthew@epamail.epa.gov [mailto:Ohl.Matthew@epamail.epa.gov]  
Sent: Monday, April 18, 2011 3:30 PM  
To: Val Blumenfeld  
Cc: DSullivan@NiSource.com; lisa.bradley@aecom.com;  
Thurlow.Timothy@epamail.epa.gov; alanmurray5@comcast.net  
Subject: Town of Pines

Ms. Blumenfeld:

Thanks for your prompt reply and the offer that Mr. Murray may contact you directly in this matter. Please let us know the contractor's response regarding culvert near Ardendale Rd. and US Highway 20.

Thank you.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

EPA-R5-2013-003300-133

"Val Blumenfeld"  
<VBLUMENFELD@bibtc.com  
>

05/04/2011 05:02 PM

To Matthew Ohl

cc DSullivan, Timothy Thurlow, "Lisa Bradley"

bcc

Subject Town of Pines @ Ardendale

Hi Matt-

I spoke to Allen Murray and the contractor involved in the installation of the Michigan City municipal water system in the Town of Pines.

As Project Coordinator I should have been notified by the Town of the problems at the Ardendale Ave . culvert if they thought it was due to construction of the municipal water lines (this culvert is not part of the new city system-it is either county or town property). D&M Excavating was a subcontractor on the Town of Pines Groundwater Removal Action project and was under my direction . Instead the decision was made, without input from Brown Inc. or D&M that the town culvert was plugged due to something done during construction . So in 2007 D&M was "hired" by the Town to return to Ardendale Ave . culvert and jet out the buildup of brush and get the water flowing. It is not uncommon for culverts in the area to be clogged due to rodent activity and the fact that the county no longer does much cleaning/dredging, especially near the National Lakeshore. Lowlands are often flooded. D&M has provided this type maintenance for other towns with similar problems .

The Town refused to pay D&M for their services.

According to Ryan Miller at D&M, when the municipal water lines went in along the west side of Ardendale Ave . the existing metal culvert crossing under Ardendale was in very poor condition . A smaller plastic pipe was connected to the existing metal culvert to allow city water lines to pass under . Road wrap (fabric) is commonly used to connect two ends and keep debris from getting into the pipe . Speed crete was used as a joining material. The area was backfilled with stone. INDOT now only allows the use of metal pipe if it is coated. Plastic pipe is widely accepted for these kinds of jobs and is not considered an inferior product . The foreman on the project at the time believes that this was the best way to continue to use the old town culvert without damaging it . Town of Pines Street Dept. may have records of how old that culvert could be.

Mr. Murray told me earlier this week that a contractor had in the recent past been hired to force a pole through the culvert to dislodge the brush. This could have caused some damage to an uncoated pipe weakened by age . What I can suggest is that the next time the Town of Pines notices any deterioration in the road or shoulder at that culvert, I be notified. We can assess the situation then with all parties on site. I will watch that section of road for erosion of any kind as well.

I can also provide the name of the trapper we use.

If you have any questions please let me know.

Val Blumenfeld

Brown Inc.

219-872-8618

EPA-R5-2013-003300-134

"Val Blumenfeld"  
<VBLUMENFELD@bibtc.com  
>

To Matthew Ohl

cc

bcc

05/11/2011 11:08 AM

Subject FW: Town of Pines @ Ardendale

Matt-

Will you be contacting A. Murray concerning the culvert questions? Is there anything more I can do for you?

Val

-----Original Message-----

From: Val Blumenfeld

Sent: Monday, May 09, 2011 4:43 PM

To: 'Ohl.Matthew@epamail.epa.gov'

Cc: DSullivan@NiSource.com; Lisa Bradley; Thurlow.Timothy@epamail.epa.gov

Subject: RE: Town of Pines @ Ardendale

Matt-

I spoke to the engineer on the water extension project and the superintendant of the Michigan City Dept. of Water Works and his inspector.

Plans from Haas & Associates called for the water main to pass over the top of the culvert and allowed "less than 5' of cover in this area". However, at the time of construction as the actual grade existed, there would have been an unacceptable much less than 5' of cover over the water lines (refer to previous photos) and another route had to be determined. D&M foreman contacted Michigan City Water Dept. The superintendant approved the water main to be installed under the culvert. When the crew exposed the culvert pipe it was found to be rotted. D&M cut and removed a section of the rotted culvert and inserted a new piece (in the manner I described previously) to take its place. The city inspector's notes (Sept 1, 2005) reflect the poor condition of the culvert and that when installation was complete there was 1 ft. between the culvert and the water line below.

So to answer your questions:

According to the contractor it is not uncommon to use a slightly smaller pipe inserted into a larger one and join them together in a case like this. A larger same size pipe would have been impossible to join together with bands due to such a state of decay.

Repairing the culvert was not a part of the plans. We found the drainage pipe in bad condition. We were to, and did, install water lines around it. But because it was worn and not holding water in this section, the foreman decided to give the pipe a bottom for water to pass thru.

Val Blumenfeld  
Brown Inc.  
219-872-8618

-----Original Message-----

From: Ohl.Matthew@epamail.epa.gov [mailto:Ohl.Matthew@epamail.epa.gov]  
Sent: Thursday, May 05, 2011 10:58 AM  
To: Val Blumenfeld  
Cc: DSullivan@NiSource.com; Lisa Bradley; Thurlow.Timothy@epamail.epa.gov  
Subject: Re: Town of Pines @ Ardendale

Good morning Val:

Thank you for your response. I understand that the section of existing 4 ft. diameter pipe that was removed was replaced with a 3 ft. diameter pipe. Do you know the reason for using a smaller pipe? Do you have drawings and specifications for this part of the municipal water service extension project showing how this pipe was to be repaired after the water lines were installed?

Thank you.

Matthew J. Ohl  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442  
fax: 312.692.2447  
e-mail: ohl.matthew@epa.gov

From: "Val Blumenfeld" <VBLUMENFELD@bibtc.com>  
To: Matthew Ohl/R5/USEPA/US@EPA  
Cc: <DSullivan@NiSource.com>, Timothy Thurlow/R5/USEPA/US@EPA, "Lisa Bradley" <lbradley@ensr.aecom.com>  
Date: 05/04/2011 05:02 PM  
Subject: Town of Pines @ Ardendale

Hi Matt-

I spoke to Allen Murray and the contractor involved in the installation of the Michigan City municipal water system in the Town of Pines.

As Project Coordinator I should have been notified by the Town of the problems at the Ardendale Ave. culvert if they thought it was due to construction of the municipal water lines (this culvert is not part of the new city system-it is either county or town property). D&M Excavating was a subcontractor on the Town of Pines Groundwater Removal Action project and was under my direction. Instead the decision was made, without input from Brown Inc. or D&M that the town culvert was plugged due to something done during construction. So in 2007 D&M was "hired" by the Town to return to Ardendale Ave. culvert and jet out the buildup of brush and get the water flowing. It is not uncommon for culverts in the area to be clogged due to rodent activity and the fact that the county no longer does much cleaning/dredging, especially near the National Lakeshore. Lowlands are often flooded. D&M has provided

this type maintenance for other towns with similar problems .

The Town refused to pay D&M for their services.

According to Ryan Miller at D&M, when the municipal water lines went in along the west side of Ardendale Ave. the existing metal culvert crossing under Ardendale was in very poor condition. A smaller plastic pipe was connected to the existing metal culvert to allow city water lines to pass under. Road wrap (fabric) is commonly used to connect two ends and keep debris from getting into the pipe. Speed crete was used as a joining material. The area was backfilled with stone. INDOT now only allows the use of metal pipe if it is coated. Plastic pipe is widely accepted for these kinds of jobs and is not considered an inferior product. The foreman on the project at the time believes that this was the best way to continue to use the old town culvert without damaging it. Town of Pines Street Dept. may have records of how old that culvert could be.

Mr. Murray told me earlier this week that a contractor had in the recent past been hired to force a pole through the culvert to dislodge the brush. This could have caused some damage to an uncoated pipe weakened by age.

What I can suggest is that the next time the Town of Pines notices any deterioration in the road or shoulder at that culvert, I be notified. We can assess the situation then with all parties on site. I will watch that section of road for erosion of any kind as well.

I can also provide the name of the trapper we use.

If you have any questions please let me know.

Val Blumenfeld

Brown Inc.

219-872-8618

EPA-R5-2013-003300-135

**"Val Blumenfeld "**  
**<VBLUMENFELD@bibtc.com**  
**>**

05/12/2011 12:21 PM

To "Nancy Kolasinski"

cc "R. Miller", Matthew Ohl, "R.Russell"

bcc

Subject Town of Pines Ardendale Culvert N of US Hwy 20

Mr. Murray-

Attached is my e-mail correspondence to Matt Ohl, USEPA Remedial Project Manager, about the condition of the culvert at Ardendale Ave. and US Hwy 20. As you can see all parties have been notified of your concerns at this location.

I can speak to the Porter County surveyor if you'd like. If the culvert is under his jurisdiction he should be informed as well. The pipe may have to be replaced in the near future.

Val Blumenfeld



Ardendale Culvert N of US Hwy 20.doc

EPA-R5-2013-003300-136

"Val Blumenfeld "  
<VBLUMENFELD@bibtc.com  
>

05/12/2011 12:29 PM

To "Alan Murray"

cc Matthew Ohl, "R.Russell", "Ryan Miller"

bcc

Subject FW: Town of Pines Ardendale Culvert N of US Hwy 20

The first attachment did not go thru. Trying again...

Mr. Murray-

Attached is my e-mail correspondence to Matt Ohl, USEPA Remedial Project Manager, about the condition of the culvert at Ardendale Ave. and US Hwy 20. As you can see all parties have been notified of your concerns at this location.

I can speak to the Porter County surveyor if you'd like. If the culvert is under his jurisdiction he should be informed as well. The pipe may have to be replaced in the near future.

Val Blumenfeld



Ardendale Culvert N of US Hwy 20.doc



Ardendale Repairs.doc

EPA-R5-2013-003300-137

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
05/12/2011 05:33 PM

To Matthew Ohl  
cc Eric.Morton, cgorman, david.homer  
bcc  
Subject RE: Conference Call, Friday, May 12 at 2:00 pm

Hi Matt:

Since talking with you I haven't been able to talk with Paul Kysel to confirm that 2:00 works for him. I'll let you know and send out a call-in number as soon as I know it will work.  
So what or who is SulTRAC?

Mark

-----Original Message-----

From: Ohl.Matthew@epamail.epa.gov [mailto:Ohl.Matthew@epamail.epa.gov]  
Sent: Thursday, May 12, 2011 4:08 PM  
To: Mark Hutson  
Cc: Eric.Morton@tetrattech.com; cgorman@onesullivan.com;  
david.homer@tetrattech.com  
Subject: Conference Call, Friday, May 12 at 2:00 pm

Hello Mark:

To follow-up on your request for a conference call, please provide the call-in number. I'll ask if anyone from SulTRAC is available to be on the call.

Thank you.

Matthew J. Ohl  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442  
fax: 312.692.2447  
e-mail: ohl.matthew@epa.gov

EPA-R5-2013-003300-138

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
05/13/2011 09:18 AM

To Matthew Ohl  
cc  
bcc

Subject RE: Conference Call, Friday, May 12 at 2:00 pm

Matt

We are about to have a conference call with the Pines folks. It seems that there is now an issue with having our call at 2:00 with you. Would you be available to have our call later this morning if I can get everyone corraled?

Sorry about that.

Mark Hutson

-----Original Message-----

From: Ohl.Matthew@epamail.epa.gov [mailto:Ohl.Matthew@epamail.epa.gov]  
Sent: Thursday, May 12, 2011 4:08 PM  
To: Mark Hutson  
Cc: Eric.Morton@tetrattech.com; cgorman@onesullivan.com;  
david.homer@tetrattech.com  
Subject: Conference Call, Friday, May 12 at 2:00 pm

Hello Mark:

To follow-up on your request for a conference call, please provide the call-in number. I'll ask if anyone from SulTRAC is available to be on the call.

Thank you.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

EPA-R5-2013-003300-139

"Bradley, Lisa"  
<lisa.bradley@aecom.com>

06/15/2011 01:38 PM

To Matthew Ohl

cc

bcc

Subject RE: Gamma Count Rate Survey

Hi Matt - We did not provide a specific response to the Gamma Survey Report prepared by Larry Jensen for the P.I.N.E.S., dated October 2009.

We were first made aware of it in January of 2010, and obtained a copy at the beginning of February. We submitted the HHRA Report on March 3, 2010, thus at that time, it seemed more expedient to submit the HHRA Report with the detailed radiological evaluation that we had already conducted. Note that the type of gamma survey that was conducted is essentially a screening survey, that would only indicate whether or not more detailed evaluation may be warranted. There are so many things that we do not know about the work, e.g., exactly where the samples were collected, whether or not appropriate background locations were used (for example, appropriate background for a roadway location would be another roadway of similar age and construction). Thus while interesting, it is of limited utility since we have collected roadway samples of suspected CCBs under the Municipal Water Service Extension (MWSE) Sampling and Analysis Plan (SAP), and included a quantitative evaluation of the validated results in our risk assessment report, where the October 2010 version included a quantitative risk assessment following USEPA guidelines. As the MWSE samples were collected under an agency approved work plan, analyzed and the data validated, and the results were used in a quantitative risk assessment, I'm not sure that there is much more that the Gamma Survey Report can add.

Please let me know if you would like to discuss this further.

:) LAIS

Lisa JN Bradley, Ph.D., DABT  
Senior Toxicologist and Vice President, Environment  
D 978-589-3059 C 978-846-3463  
lisa.bradley@aecom.com

AECOM  
2 Technology Park Drive, Westford, MA 01886  
T 978-589-3000 F 866-758-4856  
www.aecom.com

-----Original Message-----

From: Ohl.Matthew@epamail.epa.gov [mailto:Ohl.Matthew@epamail.epa.gov]  
Sent: Thursday, June 09, 2011 8:26 AM  
To: Bradley, Lisa  
Subject: Gamma Count Rate Survey

(See attached file: Gamma\_survey\_LJensen.PDF)

Lisa:

Did AECOM provide a response to this report? If so, could you provide a copy?

Thanks,  
Matthew J. Ohl  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442  
fax: 312.692.2447  
e-mail: ohl.matthew@epa.gov

EPA-R5-2013-003300-140

**DSullivan@NiSource.com**

07/14/2011 01:46 PM

To Matthew Ohl, kherron

cc

bcc

Subject TAP Progress Report - Pines

Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap211.pdf)

Dan Sullivan

NiSource Environmental Safety & Sustainability



(219) 647-5248 **tap211.pdf**

EPA-R5-2013-003300-141

**DSullivan@NiSource.com**

01/16/2012 03:32 PM

To Matthew Ohl

cc kherron

bcc

Subject TAP Progress Report - Pines

Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap411.pdf)

Dan Sullivan

NiSource Environmental Safety & Sustainability



(219) 647-5248 **tap411.pdf**

EPA-R5-2013-003300-142

**Ajit Vaidya /R5/USEPA/US**

02/14/2012 11:28 AM

To Timothy Prendiville, Matthew Ohl

cc Joan Tanaka

bcc

Subject \*\* Control \*\* - Town of Pines letter from community

Tim,



Town of Pines Control Letter.pdf

Here's a letter that was sent to Susan Hedman last week, which we just received this morning at the Branch Chiefs' meeting. Based on the master site spreadsheet, it looks like the RPM is Matt Ohl in your section. Could you please take the lead in drafting a response to this letter? The receipt date to the RA's office is Feb. 8, 2012.

Thanks, Ajit

\*\*\*\*\*

Ajit Vaidya, P.E., Chief  
Remedial Response Section 1  
Superfund Division  
U.S. EPA Region 5  
77 W. Jackson Blvd. (SR-6J)  
Chicago, IL 60604  
vaidya.ajit@epa.gov  
312-353-5713 - phone

\*\*\*\*\*

EPA-R5-2013-003300-143

**Matthew Ohl/R5/USEPA/US**

02/15/2012 02:13 PM

To Timothy Thurlow

cc

bcc

Subject Pines Site



Jensen Response to Comments10122011.pdf

Tim:

Here is the response from PINES referred to in the letter.

Thanks.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

EPA-R5-2013-003300-144

**Matthew Ohl/R5/USEPA/US**

02/29/2012 05:08 PM

To Timothy Thurlow, Janet Pope

cc

bcc

Subject Response to PINES

FYI

----- Forwarded by Matthew Ohl/R5/USEPA/US on 02/29/2012 05:07 PM -----

From: KAREN JEFFRIES/R5/USEPA/US  
To: Matthew Ohl/R5/USEPA/US@EPA  
Date: 02/29/2012 05:05 PM  
Subject: Fw: Electronic Copy

---



Letter to Kim Ferraro re Town of Pines Superfund Site.pdf

EPA-R5-2013-003300-145

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**

03/15/2012 12:01 PM

To Matthew Ohl

cc

bcc

Subject Pines status check

Hi Matt

I am realizing that we haven't heard anything about the Pines risk assessments or RAO comments for a couple of months and am wondering what the status is. Have you sent combined comments to the PRPs yet? I don't want to miss something by assuming that they haven't come out yet.

Thanks,

Mark

**Mark Hutson**

**Geo-Hydro, Inc**

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-146

**James Mitchell /R5/USEPA/US**

To Matthew Ohl, EUGENE JABLONOWSKI

03/26/2012 05:42 PM

cc

bcc

Subject Re: Fw: Region 5 Superfund cleanup- Pines, Indiana

I would not be available until next week. I am on vacation.

Matthew Ohl

----- Original Message -----

**From:** Matthew Ohl

**Sent:** 03/26/2012 04:07 PM CDT

**To:** Eugene Jablonowski

**Cc:** James Mitchell

**Subject:** Re: Fw: Region 5 Superfund cleanup- Pines, Indiana

Thanks Gene. What is your availability?

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

EUGENE JABLONOWSKI

Matt, Just received this toda...

03/26/2012 03:30:57 PM

From: EUGENE JABLONOWSKI/R5/USEPA/US  
To: Matthew Ohl/R5/USEPA/US@EPA  
Cc: James Mitchell/R5/USEPA/US@EPA  
Date: 03/26/2012 03:30 PM  
Subject: Fw: Region 5 Superfund cleanup- Pines, Indiana

Matt,

Just received this today, likely due to our previous ER support on other Indiana sites. I think we should set up a teleconference with her and respond together.

Eugene Jablonowski, MS  
Health Physicist  
U.S. EPA Region 5 Emergency Response  
77 W. Jackson Blvd. (SMF-5J)  
Chicago, IL 60604  
(312) 886-4591 office  
(312) 493-4363 cell  
(312) 692-2466 fax  
jablonowski.eugene@epa.gov

----- Forwarded by EUGENE JABLONOWSKI/R5/USEPA/US on 03/26/2012 03:27 PM -----

From: "Stiker, Mary" <Mstiker@dhs.IN.gov>  
To: EUGENE JABLONOWSKI/R5/USEPA/US@EPA  
Cc: "Dresen, Laura \ (DHS)" <LDresen@dhs.IN.gov>  
Date: 03/26/2012 03:11 PM  
Subject: Region 5 Superfund cleanup- Pines, Indiana

Good Afternoon. Indiana Dept of Homeland Security- Radiological Health received a letter requesting assistance with potential radioactive contamination in the Town of Pines, Indiana. The PINES (People in Need of Environmental Safety) Group did a gamma count rate survey in 2009. They would like us to confirm specific readings, identify, and look at concentrations of specific isotopes. Wondering if you would have any additional information that would be helpful to me before I proceed with this request. The letter states that there were extensive areas of elevated count rates that they believe may be due to coal ash. I do work with NIPSCO a fair amount of time and would like to make sure I have all the information first before proceeding.

Thanks for any information you might be able to pass on. I can be reached at 317/605-7546 if that works out better for you.

Mary Stiker  
Rad Specialist  
Indiana Dept of Homeland Security

EPA-R5-2013-003300-147

"Stiker, Mary"  
<Mstiker@dhs.IN.gov>  
04/02/2012 06:56 AM

To Matthew Ohl  
cc  
bcc  
Subject Re: Pines Site - Radiation Survey and Risk Assessment

Thanks do much!

On Apr 2, 2012, at 7:19 AM, "Matthew Ohl" <Ohl.Matthew@epamail.epa.gov<mailto:Ohl.Matthew@epamail.epa.gov>> wrote:

(See attached file: PINES Radiation Survey and Risk Assessment FINAL.pdf)

Good morning Mary:  
As we discussed, please see the attached letter and let me know if you have any questions.  
Thank you.  
Matthew J. Ohl  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442  
fax: 312.692.2447  
e-mail: ohl.matthew@epa.gov<mailto:ohl.matthew@epa.gov>

<graycol.gif>"Stiker, Mary" ---03/27/2012 10:21:54 AM---Thanks Matt for taking the time to talk with me. My main goal in this is to make sure we are all on

From: "Stiker, Mary" <Mstiker@dhs.IN.gov<mailto:Mstiker@dhs.IN.gov>>  
To: Matthew Ohl/R5/USEPA/US@EPA  
Date: 03/27/2012 10:21 AM  
Subject: Request from Pines

---

Thanks Matt for taking the time to talk with me. My main goal in this is to make sure we are all on the same page.

Mary Stiker  
[attachment "Town of Pines.pdf" deleted by Matthew Ohl/R5/USEPA/US]  
<PINES Radiation Survey and Risk Assessment FINAL.pdf>

EPA-R5-2013-003300-148

**DSullivan@NiSource.com**

04/16/2012 01:44 PM

To Matthew Ohl

cc kherron

bcc

Subject TAP Progress Report - Pines

Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap112.pdf)

Dan Sullivan

NiSource Environmental Safety & Sustainability



(219) 647-5248 **tap112.pdf**

EPA-R5-2013-003300-149

**Matthew Ohl/R5/USEPA/US**

05/01/2012 09:35 AM

To "Gorman, Cheryl"

cc "Morton, Eric"

bcc

Subject Letter from PINES Group



R5-12-000-7371 Incoming.pdf

Good morning:

Please let me know if you have any information regarding the alleged falsification of data in the attached letter.

Thank you.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

EPA-R5-2013-003300-150

"Mark Hutson "  
<mhutson@geo-hydro.com>

06/14/2012 04:46 PM

To Matthew Ohl

cc

bcc

Subject Pines RAO Clarifications

Matt

I need a little clarification on the revised RAO's for the Pines site. In preparing to explain the revised RAO's to the PINES group I came across some differences that I'm not sure I understand. I thought that rather than calling you and asking questions out of the blue, I'd send you my initial questions and call you to talk about them when you're ready.

Questions:

- 1) RAO #1 - The addition of the requirement that COC concentrations in wells be "greater than background levels that are unaffected by site-related contamination" opens up the process to potential gaming. Has there been any discussion of sampling locations where background levels will be established? Will EPA be approving and observing background sample collection? Will unimpacted background levels be based on the highest background concentration actually measured in each media, or will statistical manipulation be employed to justify a wider range of potential background values?
- 2) RAO #1, 2, 4, 5, 6 - Does the phrase "...1E-06 to 1E-04 **and** a target endpoint specific hazard index of 1..." indicate that both conditions must be true in order for RAO #1 to apply, or are these independent triggers, either of which would make RAO #1 apply? The previous version of RAO #1 included lists of wells for each condition. The new RAO #1 includes only one slightly shorter list of wells. Why were wells MW104 and MW106 eliminated from the revised RAO #1?
- 3) RAO #1, 2, 4, 5, 6 - The first version of RAO #1 stated "... risks greater than or equal to 1E-06," The new version of RAO #1 states "risks within and/or above USEPA's target risk range of 1E-06 to 1E-04..." What is the significance of this change of wording?
- 4) RAO #6 - The first version of RAO #1 specified that groundwater monitoring be conducted to ensure that beneficial uses of ground water are met "at the waste management boundary of Yard 520 and other disposal/fill areas". The new revised ROA #6 eliminates reference to any compliance boundary. Where will the new compliance boundary be located?

Let me know when you're available to talk for a few minutes and I'll give you a call.

Thanks,

Mark

**Mark Hutson**

**Geo-Hydro, Inc**

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-151

**Matthew Ohl/R5/USEPA/US**

06/18/2012 06:54 AM

To cgorman, Eric.Morton

cc

bcc

Subject Fw: Pines RAO Clarifications

Good morning:

Please let me know when you would be available for a call .

Thank you.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

----- Forwarded by Matthew Ohl/R5/USEPA/US on 06/18/2012 06:40 AM -----

From: "Mark Hutson" <mhutson@geo-hydro.com>

To: Matthew Ohl/R5/USEPA/US@EPA

Date: 06/14/2012 04:47 PM

Subject: Pines RAO Clarifications

---

Matt

I need a little clarification on the revised RAO's for the Pines site. In preparing to explain the revised RAO's to the PINES group I came across some differences that I'm not sure I understand. I thought that rather than calling you and asking questions out of the blue, I'd send you my initial questions and call you to talk about them when you're ready.

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- 3) RAO #1, 2, 4, 5, 6 - The first version of RAO #1 stated "... risks greater than or

equal to 1E-06,” The new version of RAO #1 states “risks within and/or above USEPA's target risk range of 1E-06 to 1E-04...” What is the significance of this change of wording?

4) RAO #6 - The first version of RAO #1 specified that groundwater monitoring be conducted to ensure that beneficial uses of ground water are met “at the waste management boundary of Yard 520 and other disposal/fill areas”. The new revised ROA #6 eliminates reference to any compliance boundary. Where will the new compliance boundary be located?

Let me know when you're available to talk for a few minutes and I'll give you a call.

Thanks,

Mark

**Mark Hutson**

**Geo-Hydro, Inc**

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-152

**Matthew Ohl/R5/USEPA/US**

06/18/2012 11:08 AM

To

cc

bcc

Subject Pines RAO Clarifications Call (866) 299-3188 Code  
3128862064

**Meeting**

Date 06/18/2012

Time 12:00:00 PM to 01:00:00 PM

Chair Matthew Ohl

Invitees

Required Eric.Morton; mhutson

Optional

FYI

Location

---

Matt

I need a little clarification on the revised RAO's for the Pines site. In preparing to explain the revised RAO's to the PINES group I came across some differences that I'm not sure I understand. I thought that rather than calling you and asking questions out of the blue, I'd send you my initial questions and call you to talk about them when you're ready.

Questions:

1) RAO #1 - The addition of the requirement that COC concentrations in wells be "greater than background levels that are unaffected by site-related contamination" opens up the process to potential gaming. Has there been any discussion of sampling locations where background levels will be established? Will EPA be approving and observing background sample collection? Will unimpacted background levels be based on the highest background concentration actually measured in each media, or will statistical manipulation be employed to justify a wider range of potential background values?

2) RAO #1, 2, 4, 5, 6 - Does the phrase "...1E-06 to 1E-04 **and** a target endpoint specific hazard index of 1..." indicate that both conditions must be true in order for RAO #1 to apply, or are these independent triggers, either of which would make RAO #1 apply? The previous version of RAO #1 included lists of wells for each condition. The new RAO #1 includes only one slightly shorter list of wells. Why were wells MW104 and MW106 eliminated from the revised RAO #1?

- 3) RAO #1, 2, 4, 5, 6 – The first version of RAO #1 stated “... risks greater than or equal to 1E-06,” The new version of RAO #1 states “risks within and/or above USEPA's target risk range of 1E-06 to 1E-04...” What is the significance of this change of wording?
- 4) RAO #6 - The first version of RAO #1 specified that groundwater monitoring be conducted to ensure that beneficial uses of ground water are met “at the waste management boundary of Yard 520 and other disposal/fill areas”. The new revised ROA #6 eliminates reference to any compliance boundary. Where will the new compliance boundary be located?

Let me know when you're available to talk for a few minutes and I'll give you a call.

Thanks,

Mark

**Mark Hutson**  
**Geo-Hydro, Inc**  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-153

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**

06/19/2012 09:48 AM

To Matthew Ohl

cc

bcc

Subject Pines Alternatives Screening

Morning Matt,

Did the Alternatives Screening document arrive yesterday?

Mark

**Mark Hutson**

**Geo-Hydro, Inc**

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-154

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
06/19/2012 10:45 AM

To: Matthew Ohl  
cc  
bcc  
Subject: FW: Pines Alternatives Screening

Matt

Never mind, they sent them to Paul Kysel last night at 1:51 am. Somebody had a long day yesterday.

Mark

---

**From:** Mark Hutson [mailto:mhutson@geo-hydro.com]  
**Sent:** Tuesday, June 19, 2012 8:48 AM  
**To:** Matt Ohl (Ohl.Matthew@epamail.epa.gov)  
**Subject:** Pines Alternatives Screening

Morning Matt,

Did the Alternatives Screening document arrive yesterday?

Mark

**Mark Hutson**  
**Geo-Hydro, Inc**  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-155

**Matthew Ohl/R5/USEPA/US**

06/19/2012 11:14 AM

To "Mark Hutson"

cc

bcc

Subject Re: Pines Alternatives Screening

Hi Mark:

Yes, they sent it to Paul.

Thanks.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: [ohl.matthew@epa.gov](mailto:ohl.matthew@epa.gov)

"Mark Hutson"

Morning Matt,

06/19/2012 09:48:27 AM

From: "Mark Hutson" <[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

To: Matthew Ohl/R5/USEPA/US@EPA

Date: 06/19/2012 09:48 AM

Subject: Pines Alternatives Screening

---

Morning Matt,

Did the Alternatives Screening document arrive yesterday?

Mark

**Mark Hutson**

**Geo-Hydro, Inc**

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-156

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**

06/25/2012 01:34 PM

To Matthew Ohl

cc

bcc

Subject Schedule for comments on Pines Alternatives Screening  
Memorandum

Hi Matt

What is the schedule for having our comments on the draft Development and Screening of Alternatives Memorandum to you? We're going to have some comments and I want to be sure we get them to you on time.

Thanks,

Mark

**Mark Hutson**  
**Geo-Hydro, Inc**  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-157

**"Stiker, Mary"**  
**<Mstiker@dhs.IN.gov>**  
06/27/2012 01:57 PM

To EUGENE JABLONOWSKI  
cc Matthew Ohl  
bcc  
Subject Pines Update

<http://www.pinesupdate.com/>

Just an FYI. Please also note the Indiana State Dept of Health Radiochemistry Lab individual, Jane Smith, did tell Mr Jensen that they would not be able to provide any additional rad analysis.

Thanks, Mary Stiker

Indiana Dept of Homeland Security  
Rad Soecialist

EPA-R5-2013-003300-158

**Matthew Ohl/R5/USEPA/US**

07/09/2012 04:59 PM

To cgorman, Eric.Morton, Keith Fusinski

cc

bcc

Subject Pines Site - PINES Comments on Alternatives Screening  
Technical Memorandum

FYI

Matthew J. Ohl  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: [ohl.matthew@epa.gov](mailto:ohl.matthew@epa.gov)

----- Forwarded by Matthew Ohl/R5/USEPA/US on 07/09/2012 04:58 PM -----

From: "Mark Hutson" <[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>  
To: Matthew Ohl/R5/USEPA/US@EPA,  
Cc: "Charles Norris" <[cnorris@geo-hydro.com](mailto:cnorris@geo-hydro.com)>, "Paul Kysel" <[pkysel@live.com](mailto:pkysel@live.com)>  
Date: 07/09/2012 04:49 PM  
Subject: PINES Comments on Alternatives Screening Technical Memorandum

---

Matt

On behalf of P.I.N.E.S. I am attaching our comments on the Alternatives Screening Technical Memorandum dated June 2012. I think it's safe to say that it lived-up to all our expectations.

Please let me know if you have any questions.

Mark

**Mark Hutson**

**Geo-Hydro, Inc**

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



20120709 Pines Comments on Draft Alternatives Screening Memo FNL.pdf

EPA-R5-2013-003300-159

**Matthew Ohl/R5/USEPA/US**

08/31/2012 11:51 AM

To lisa.bradley

cc

bcc

Subject PINES Comments on Alternative Screening Technical  
Memorandum



20120709 Pines Comments on Draft Alternatives Screening Memo FNL.pdf

Hi Lisa:

Here's the comments from the PINES group you requested.

Thanks,

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

EPA-R5-2013-003300-160

**Keith Fusinski /R5/USEPA/US**

09/04/2012 09:31 AM

To Matthew Ohl

cc

bcc

Subject Re: Pines Site - Response to PINES

Matthew,

I have no comments at this time.

Keith Fusinski, PhD, MT(ASCP)  
Toxicologist  
U.S. EPA Region V  
734-692-7681-office  
734-692-7677-fax  
734-740-9018-cell

Matthew Ohl

Good afternoon: Please let me know if...

08/31/2012 01:41:42 PM

From: Matthew Ohl/R5/USEPA/US  
To: Timothy Thurlow/R5/USEPA/US@EPA, Keith Fusinski/R5/USEPA/US@EPA, KHERRON@idem.IN.gov,  
Date: 08/31/2012 01:41 PM  
Subject: Pines Site - Response to PINES

---

[attachment "Response to PINES Comments On Alternatives Screening Technical Memorandum DRAFT 08 31 2012.docx" deleted by Keith Fusinski/R5/USEPA/US]

Good afternoon:

Please let me know if you have any comments on the attached draft letter.

Thank you.

Matthew J. Ohl  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohl.matthew@epa.gov

EPA-R5-2013-003300-161

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**  
10/04/2012 04:52 PM

To Matthew Ohl  
cc  
bcc

Subject FW: Pines Alternatives Screening Additional Information

Matt

I just want to be sure that you did get the information that I sent the other day.  
The attachment was 7MB so I want to be sure that it went through on your e-mail.

Mark

---

**From:** Mark Hutson [mailto:mhutson@geo-hydro.com]  
**Sent:** Monday, October 01, 2012 3:15 PM  
**To:** Matt Ohl (Ohl.Matthew@epamail.epa.gov)  
**Cc:** Charles Norris; Paul Kysel; Pete Penoyer  
**Subject:** Pines Alternatives Screening Additional Information

Matt

I am attaching a file that provides the additional information requested by EPA in your responses to our comments not included in comments to the PRPs. Please let me know if you have additional questions.

Mark

**Mark Hutson**  
**Geo-Hydro, Inc**  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-162

**Matthew Ohi/R5/USEPA/US**

10/04/2012 04:54 PM

To "Mark Hutson"

cc

bcc

Subject Re: FW: Pines Alternatives Screening Additional Information

Hi Mark:

I received it without any problems.

Thank you.

Matt

Matthew J. Ohi  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: ohi.matthew@epa.gov

"Mark Hutson"

Matt

10/04/2012 04:52:50 PM

From: "Mark Hutson" <mhutson@geo-hydro.com>  
To: Matthew Ohi/R5/USEPA/US@EPA  
Date: 10/04/2012 04:52 PM  
Subject: FW: Pines Alternatives Screening Additional Information

---

Matt

I just want to be sure that you did get the information that I sent the other day.  
The attachment was 7MB so I want to be sure that it went through on your e-mail.

Mark

---

**From:** Mark Hutson [mailto:mhutson@geo-hydro.com]  
**Sent:** Monday, October 01, 2012 3:15 PM  
**To:** Matt Ohi (Ohi.Matthew@epamail.epa.gov)  
**Cc:** Charles Norris; Paul Kysel; Pete Penoyer  
**Subject:** Pines Alternatives Screening Additional Information

Matt

I am attaching a file that provides the additional information requested by EPA in your responses to our comments not included in comments to the PRPs. Please let me know if you have additional questions.

Mark

**Mark Hutson**  
**Geo-Hydro, Inc**  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-163

**DSullivan@NiSource.com**

10/15/2012 05:39 PM

To Matthew Ohl

cc kherron

bcc

Subject TAP Progress Report - Pines

Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap312.pdf)

Dan Sullivan

NiSource Environmental Safety & Sustainability



(219) 647-5248 **tap312.pdf**

EPA-R5-2013-003300-164

"katluth@gmail.com"  
<katluth@gmail.com>

10/26/2012 10:32 AM

To Janet Pope, geofbenson, Matthew Ohl

cc

bcc

Subject Yard 520

Hello Janet and Matthew,

You are listed on the EPA website as the Community Involvement Coordinator and Project Manager for Yard 520. I have some folks from The Pines that would like to give a presentation at the November 1st Northwestern Indiana Regional Planning Commission Environmental Management and Policy Committee meeting about their personal investigations into radiation problems in their community related to that site. Is this an issue you are familiar with? I like to have someone available with some balance for this kind of presentation. I am available today by cell at [\(219\) 765-4403](tel:2197654403).

Kathy Luther  
Director of Environmental Programs  
NIRPC

*Connected by DROID on Verizon Wireless*

EPA-R5-2013-003300-165

**Matthew Ohl/R5/USEPA/US**

12/06/2012 08:41 AM

To Lisa Bradley

cc

bcc

Subject Pines Site

Good morning Lisa:

Could you make the final risk assessments and the final RI report available for download to the same group as the FS and Larry Jensen at [larrylarsjensen@gmail.com](mailto:larrylarsjensen@gmail.com) and provide 7 disks of the same for the repository.

Thank you.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: [ohl.matthew@epa.gov](mailto:ohl.matthew@epa.gov)

EPA-R5-2013-003300-166

**"Mark Hutson "**  
**<mhutson@geo-hydro.com>**

01/02/2013 04:33 PM

To Matthew Ohl

cc

bcc

Subject Pines Comments on FS

Hi Matt

I'm just checking to be sure that you did get our comments on the Pines FS?

Mark

**Mark Hutson**  
**Geo-Hydro, Inc**  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-167

**Matthew Ohl/R5/USEPA/US**

01/09/2013 06:51 AM

To "Mark Hutson"

cc

bcc

Subject Re: Pines Comments on FS

Hi Mark:

Yes, I did receive your comments.

Thank you.

Matthew J. Ohl

Remedial Project Manager

United States Environmental Protection Agency

77 West Jackson Boulevard, SR-6J

Chicago, IL 60604-3590

phone: 312.886.4442

fax: 312.692.2447

e-mail: [ohl.matthew@epa.gov](mailto:ohl.matthew@epa.gov)

"Mark Hutson"

[Hi Matt](#)

01/02/2013 04:33:48 PM

From: "Mark Hutson" <[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>

To: Matthew Ohl/R5/USEPA/US@EPA,

Date: 01/02/2013 04:33 PM

Subject: Pines Comments on FS

---

Hi Matt

I'm just checking to be sure that you did get our comments on the Pines FS?

Mark

**Mark Hutson**

**Geo-Hydro, Inc**

303-948-1417

[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)

EPA-R5-2013-003300-168

**"Mark Hutson"**  
<[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>  
01/09/2013 08:42 AM

To: Matthew Ohl  
cc  
bcc  
Subject: RE: Pines Comments on FS

My, you're up early today!

---

**From:** Ohl.Matthew@epamail.epa.gov [mailto:Ohl.Matthew@epamail.epa.gov]  
**Sent:** Wednesday, January 09, 2013 5:51 AM  
**To:** Mark Hutson  
**Subject:** Re: Pines Comments on FS

Hi Mark:  
Yes, I did receive your comments.  
Thank you.  
Matthew J. Ohl  
Remedial Project Manager  
United States Environmental Protection Agency  
77 West Jackson Boulevard, SR-6J  
Chicago, IL 60604-3590

phone: 312.886.4442  
fax: 312.692.2447  
e-mail: [ohl.matthew@epa.gov](mailto:ohl.matthew@epa.gov)

▼ "Mark Hutson" ---01/02/2013 04:33:48 PM---Hi Matt

From: "Mark Hutson" <[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)>  
To: Matthew Ohl/R5/USEPA/US@EPA,  
Date: 01/02/2013 04:33 PM  
Subject: Pines Comments on FS

---

Hi Matt

I'm just checking to be sure that you did get our comments on the Pines FS?

Mark

**Mark Hutson**  
**Geo-Hydro, Inc**  
303-948-1417  
[mhutson@geo-hydro.com](mailto:mhutson@geo-hydro.com)



EPA-R5-2013-003300-169

**DSullivan@NiSource.com**

01/15/2013 02:42 PM

To Matthew Ohl

cc kherron

bcc

Subject TAP Progress Report - Pines

Attached is the Progress Report for the Pines TAP. Please let me know if you have questions or require additional information.

Thanks, Dan

(See attached file: tap412.pdf)

Dan Sullivan

NiSource Environmental Safety & Sustainability



(219) 647-5248 **tap412.pdf**

EPA-R5-2013-003300-170

**"Val Blumenfeld "**  
**<VBLUMENFELD@bulktransp**  
**ortcorp.com>**

02/15/2013 01:51 PM

To Matthew Ohl

cc

bcc

Subject Pines Ardendale Ave culvert

Matt-

I have been unsuccessful in having a discussion with the Porter County Surveyor concerning a solution at the Ardendale Ave. culvert. I have left a phone message, an e-mail and also stopped by his office (he was out) and again explained our situation to his staff. No action can be taken in a County ditch without his approval. I will continue to reach out to him.

Val Blumenfeld  
Brown Inc.  
219-872-8618

EPA-R5-2013-003300-171

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD G:\Pines Site\A\_Pines\Notice of Intent to Sue  
10-05-2010.pdf



- Notice of Intent to Sue 10-05-2010.pdf

EPA-R5-2013-003300-172

**Matthew Ohl**

To

cc

bcc

Subject UPLOAD G:\Pines Site\A\_Pines\Rad Questions for EPA.pdf



- Rad Questions for EPA.pdf

EPA-R5-2013-003300-173

**Matthew Ohl**

To

cc

bcc

Subject UPLOAD C:\Users\moh\Desktop\Pines FOIA\thurlow,\FW  
Pines Area of Investigation - Draft Feasibility Study Files.msg



- FW Pines Area of Investigation - Draft Feasibility Study Files.msg

EPA-R5-2013-003300-174

**Matthew Ohi**

To

cc

bcc

Subject   UPLOAD C:\Users\moh\\Desktop\Pines FOIA\pines sent\RE  
2nd draft Pines FS Comment Schedule.msg



- RE 2nd draft Pines FS Comment Schedule.msg

EPA-R5-2013-003300-175

**Matthew Ohl**

To

cc

bcc

Subject UPLOAD C:\Users\moh\Desktop\Pines FOIA\hardin sent\FW  
PINES Comments on 2nd draft Feasibility Study.msg



- FW PINES Comments on 2nd draft Feasibility Study.msg

EPA-R5-2013-003300-176

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA  
Files\ALTERNATIVES SCREENING\20120709 Pines  
Comments on Draft Alternatives Screening Memo FNL .pdf



- 20120709 Pines Comments on Draft Alternatives Screening Memo FNL .pdf

EPA-R5-2013-003300-177

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\Desktop\Pines FOIA  
Files\CONTROLS\Ferraro Kysel\_response\_02152012  
FINAL.pdf



- Ferraro Kysel\_response\_02152012 FINAL.pdf

EPA-R5-2013-003300-178

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA  
Files\CONTROLS\Letter to Administrator Hedman.pdf



- Letter to Administrator Hedman.pdf

EPA-R5-2013-003300-179

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA  
Files\Feasibility Study\20121226 PINES COMMENTS ON FS  
FNL.pdf



- 20121226 PINES COMMENTS ON FS FNL.pdf

EPA-R5-2013-003300-180

**Matthew Ohi**

To

cc

bcc

Subject   UPLOAD C:\Users\moh\\Desktop\Pines FOIA  
Files\RADIATION\Attachment 3 Response by PINES Group  
Feb 29 2012 USEPA5 letter b.docx



- Attachment 3 Response by PINES Group Feb 29 2012 USEPA5 letter b.docx

EPA-R5-2013-003300-181

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA  
Files\RADIATION\Jensen Response to  
Comments10122011.pdf



- Jensen Response to Comments10122011.pdf

EPA-R5-2013-003300-182

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\RAO  
Tech Memo\20120208 Pines Comments on Draft RAO  
Memo Fnl.pdf



- 20120208 Pines Comments on Draft RAO Memo Fnl.pdf

EPA-R5-2013-003300-183

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\RISK  
ASSESSMENTS\20110627 Pines Comments on the 2nd  
draft HHRA.pdf



- 20110627 Pines Comments on the 2nd draft HHRA.pdf

EPA-R5-2013-003300-184

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\RISK  
ASSESSMENTS\20110627 Pines Comments on the Draft  
Eco RA.pdf



- 20110627 Pines Comments on the Draft Eco RA.pdf

EPA-R5-2013-003300-185

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\RISK  
ASSESSMENTS\20110627 Pines Comments on the 2nd  
draft HHRA.pdf



- 20110627 Pines Comments on the 2nd draft HHRA.pdf

EPA-R5-2013-003300-186

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\RISK  
ASSESSMENTS\20110627 Pines Comments on the Draft  
Eco RA.pdf



- 20110627 Pines Comments on the Draft Eco RA.pdf

EPA-R5-2013-003300-187

**Matthew Ohi**

To

cc

bcc

Subject UPLOADED C:\Users\moh\\Desktop\Pines FOIA Files\RISK  
ASSESSMENTS\RTC Geo-Hydro\20120108 Pines  
Comments on the Pines ERA Fnl.pdf



- 20120108 Pines Comments on the Pines ERA Fnl.pdf

EPA-R5-2013-003300-188

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\RISK  
ASSESSMENTS\RTC Geo-Hydro\20120116 Pines  
Comments on the Pines HHRA Fnl.pdf



- 20120116 Pines Comments on the Pines HHRA Fnl.pdf

EPA-R5-2013-003300-189

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA  
Files\TAP\20101122 Pines TAP Workplan and Budget.pdf



- 20101122 Pines TAP Workplan and Budget.pdf

EPA-R5-2013-003300-190

**Matthew Ohl**

To

cc

bcc

Subject UPLOAD C:\Users\moh\Desktop\Pines FOIA  
Files\TAP\20101212 TAP 2 Workplans and Budgets\_final.pdf



- 20101212 TAP 2 Workplans and Budgets\_final.pdf

EPA-R5-2013-003300-191

**Matthew Ohl**

To

cc

bcc

Subject   UPLOAD C:\Users\moh\Desktop\Pines FOIA  
Files\TAP\Amendment to Pines Technical Assistance Plan  
signed 05-05-2009 376388.pdf



- Amendment to Pines Technical Assistance Plan signed 05-05-2009 376388.pdf

EPA-R5-2013-003300-192

**Matthew Ohl**

To

cc

bcc

Subject UPLOADED C:\Users\moh\Desktop\Pines FOIA  
Files\TAP\Amendment to Pines Technical Assistance Plan  
signed 05-05-2009.pdf



- Amendment to Pines Technical Assistance Plan signed 05-05-2009.pdf

EPA-R5-2013-003300-193

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\TAP\First  
Amendment to the TAP 376388.pdf



- First Amendment to the TAP 376388.pdf

EPA-R5-2013-003300-194

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA  
Files\TAP\Pines Group Monthly Progress Report July  
2011.doc



- Pines Group Monthly Progress Report July 2011.doc

EPA-R5-2013-003300-195

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA  
Files\TAP\Rodriguez-ltr.pdf



- Rodriguez-ltr.pdf

EPA-R5-2013-003300-196

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\Tim  
Drexler's Pines Files\TAP\_Docs\conflict\_statem.pdf



- conflict\_statem.pdf

EPA-R5-2013-003300-197

**Matthew Ohi**

To

cc

bcc

Subject UPLOAD C:\Users\moh\\Desktop\Pines FOIA Files\Tim  
Drexler's Pines Files\TAP\_Docs\Rad Questions for EPA.pdf



- Rad Questions for EPA.pdf

EPA-R5-2013-003300-198

**Matthew Ohl**

To

cc

bcc

Subject   UPLOAD C:\Users\moh\Desktop\Pines FOIA Files\Tim  
Drexler's Pines  
Files\TAP\_Docs\PINES\_monthlies\tap\_progress\_0107.pdf



- tap\_progress\_0107.pdf

EPA-R5-2013-003300-199

**Matthew Ohi**

To

cc

bcc

Subject   UPLOAD C:\Users\moh\\Desktop\Tim Drexler's Pines  
Files\PINES\Correspondence\LJohnsonltr\_080010.pdf



- LJohnsonltr\_080010.pdf